THE PAPER INDUSTRY
and PAPER WORLD
AN EDUCATIONAL NEWS MAGAZINE — JUNE, 1949

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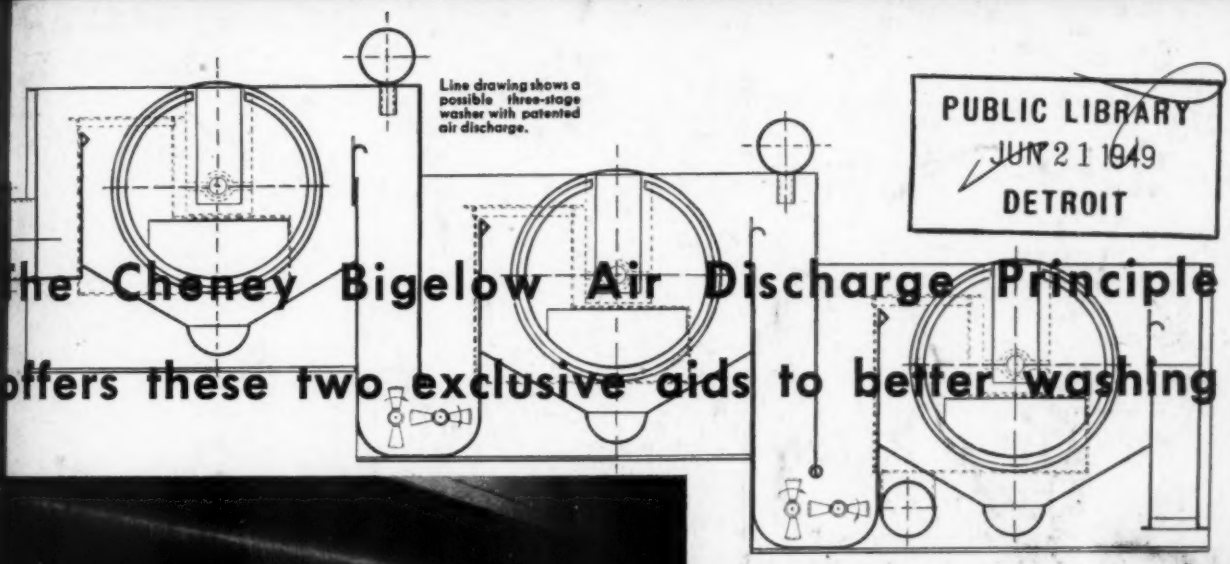
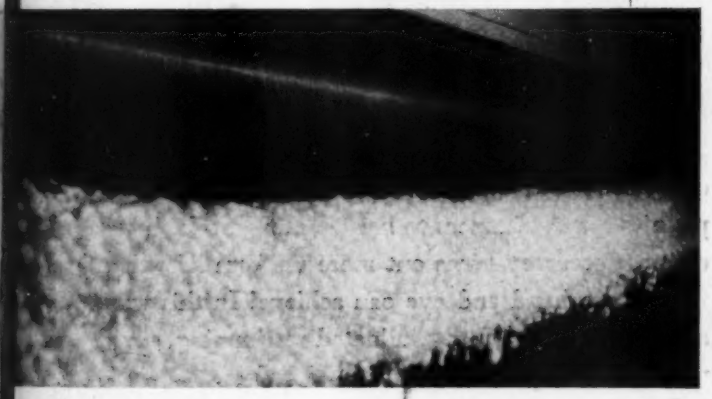
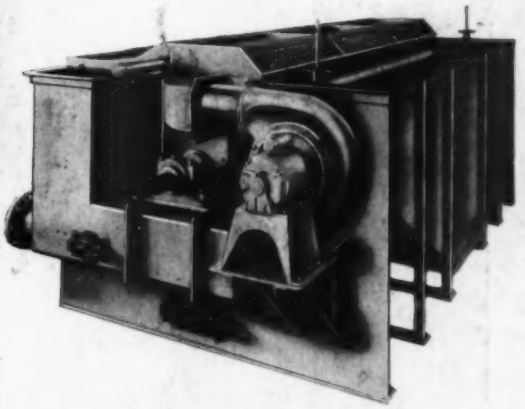


Line drawing shows a possible three-stage washer with patented air discharge.

The Cheney Bigelow Air Discharge Principle offers these two exclusive aids to better washing



Photograph of washer in operation with .5% incoming consistency, showing stock discharge at 4.5%.



● Dirt, pitch and other foreign substances can't be pressed back into the fibres because *there is no couch.*

● Eliminates filtering through a heavy mat, resulting in a cleaner end product.

PULP & PAPER MILL EQUIPMENT

Cheney Bigelow

SPRINGFIELD, MASSACHUSETTS

WRITE for full information about this important new air discharge principle which loosens all foreign matter by washing, then dewaters by blowing the stock off the cylinder face. Cheney Bigelow Wire Works, Springfield, Massachusetts.

Have you weighed the efficiency of a new

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...against finishing-room penalties you may be paying ?

The Seybold Mill Spacer-Trimmer automatically spaces one cut after another . . . various sizes . . . from a predetermined setting. All Seybold Mill Trimmers have the exclusive Z-Action knife travel.

- Out-of-square Piles
- Unnecessary Retrimming
- Tonnage Bottle Necks
- Lost Floor Space
- Too Frequent Servicing
- Too Many Machines
- Excessive Spoilage

Some mills are learning this: The amazing production capacity of the Seybold "Sixty" Mill Spacer-Trimmer permits fewer trimmers to handle more work. Their extreme accuracy turns out more uniform lifts than the human hand and eye can achieve! In this way, automatic spacing has eliminated retrimming, saved untold working hours and rejected orders.

Important cost savings are frequently introduced into paper cutting operations by the analysis of a Harris-Seybold representative. His recommendations are based upon many years of close association with paper cutting production. Why not put your particular problem up to him?

HARRIS-SEYBOLD

General Offices—Cleveland 5, Ohio

West Virginia: kraft paper and board

At Charleston, South Carolina, this mill of the West Virginia Pulp and Paper Company makes top quality kraft paper and board in a wide variety of weights. A new Beloit High Speed Kraft Fourdrinier machine, the mill's number two, was started recently and, according to company statements, is successfully carrying its share of the load. And Beloit additions on number one machine are helping materially to cut operating costs. Various items of Beloit equipment are used in each of this company's six mills.—*Beloit Iron Works, Beloit, Wis.*

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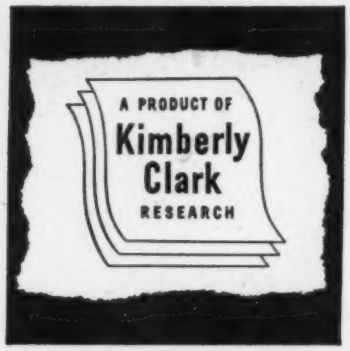

• The trademark of Kimberly-Clark Corporation identifies a host of quality paper products ranging from creped wadding to high-grade coated book papers. Each product in this widely diversified line is the result of extensive research and development work in that particular field.

• Founded in 1872 as a producer of rag newsprint, Kimberly-Clark has built its business — and its reputation — upon the principle of the best possible product, sold at reasonable cost, and customers well served.

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One product especially developed for use by the Paper Industry is Wyandotte Precipitated Calcium Carbonate, a "tailor-made" paper-coating pigment.

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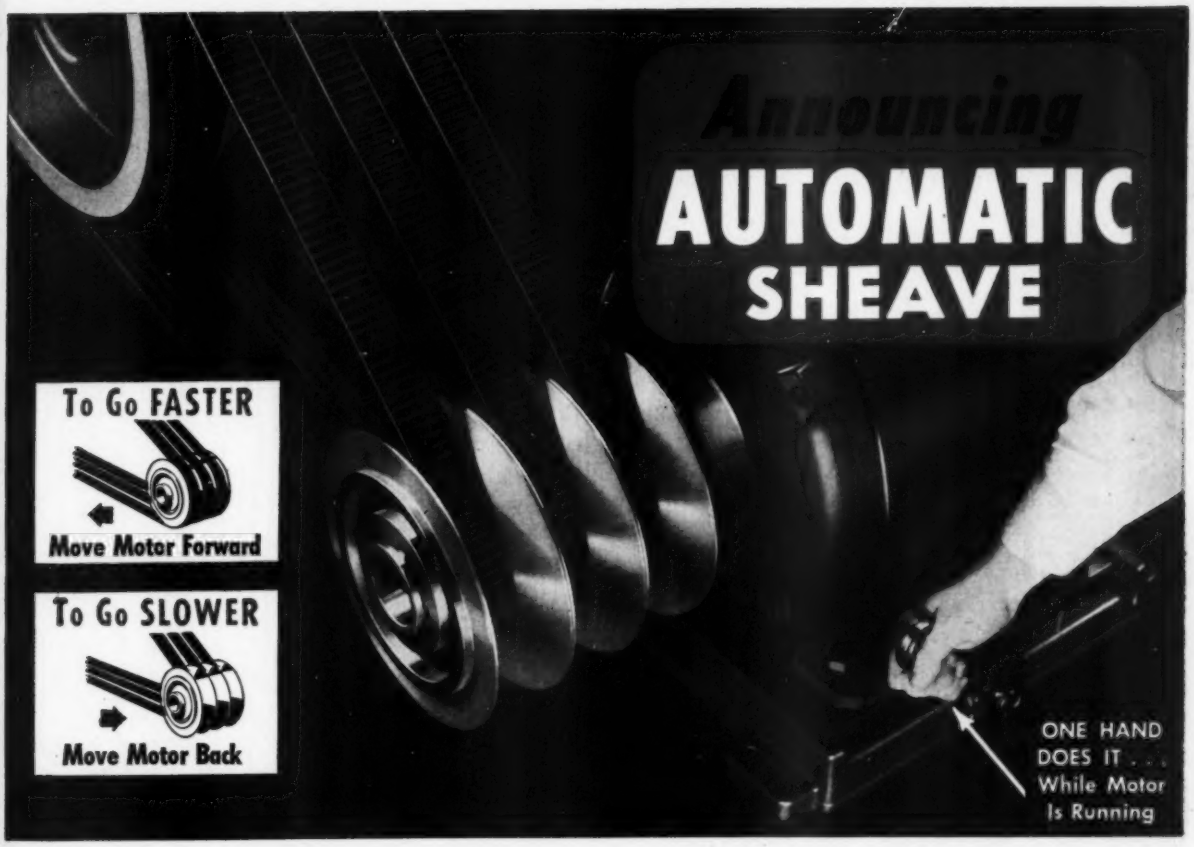

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SIMPLEST, most economical method of instant speed control ever devised. Simply move motor forward to increase speed and move it back to decrease. The new *Vari-Pitch* Automatic Sheave changes pitch diameter and holds belts at proper tension automatically. All other parts of the drive are standard *Texrope* V-belt drive components.

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ALLIS-CHALMERS

THIS IS PRE-LOGGING

Pre-logging is the harvesting in advance of smaller trees which otherwise would be damaged or destroyed if left until the big trees are logged. This isn't as simple as it sounds. To pre-log efficiently meant devising special new and mobile logging equipment.

However, the effort is justified in the recovery of many cords per acre of good clean material, highly desirable in the manufacture of sulphite or sulphate pulp.

Pre-logging fits into the method of "block" harvesting as used in the Douglas fir region, where forest lands are clearcut in a patchwork pattern, leaving blocks of seed trees as a source of regeneration. This is all part of the cycle of growth, harvest and regrowth known as Tree Farming.

Weyerhaeuser's use of the pre-logging method is another step toward more complete utilization of the timber crop.

YES! GO WEST!

1949 Fall Meeting TAPPI Portland, Oregon

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U. S. Pat. Off.)

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THIS Marx Saveall recovers suspended fiber from waste white water at a folding box board mill. It consists primarily of two large steel plate cones, one mounted inside the other. The inner cone has a large opening at the bottom. There is also a small cone-shaped receiving well at the top and an inverted de-aeration cone directly under the receiving well. Waste white water from the paper board machines is fed into the receiving well at the top and flows over the edge of the de-aeration cone into the Saveall. The suspended solids settle through the bottom of the inside cone, collect in the bottom of the outside cone and are drawn off and re-used in the paper making process. The water, minus most of the solids, rises between the two cones and overflows into a weir at the top of the outer cone. From there it is piped to the mill for re-use or discharged into a drain.

Marx Savealls are typical of the special steel plate structures we build. Let our engineers work with you on your next job that requires steel plate work.

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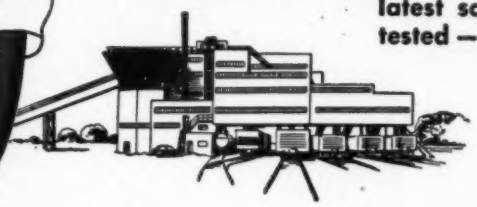

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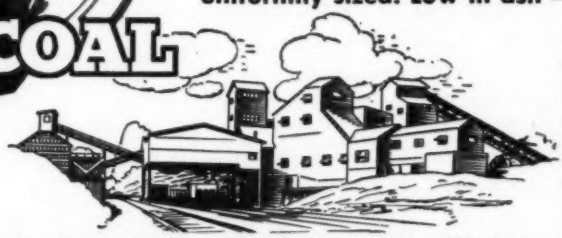

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Southern's 53 years of experience and staff of Combustion Engineers are ready to help you solve your particular boiler room problems. Telephone, write or wire and a Southern representative will call.

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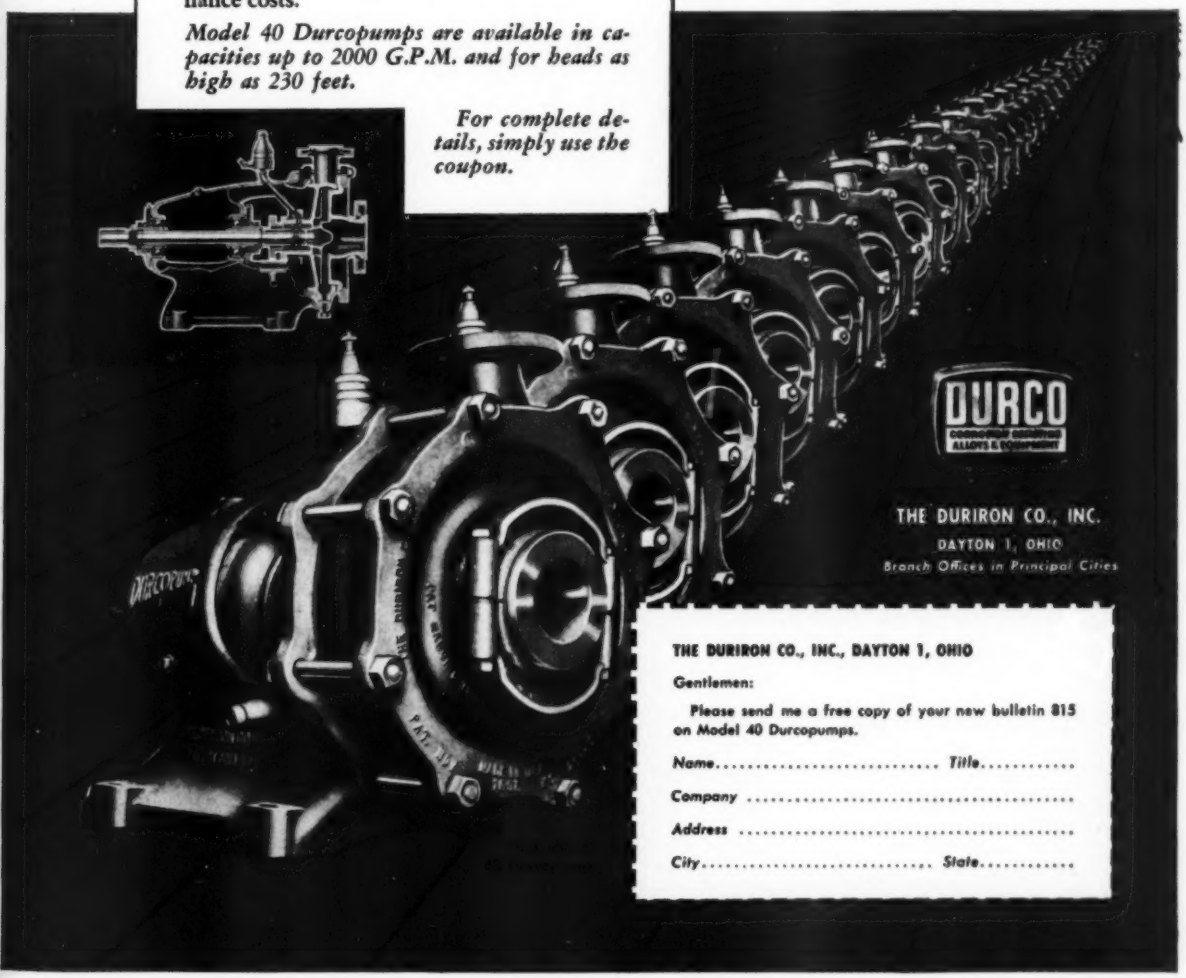

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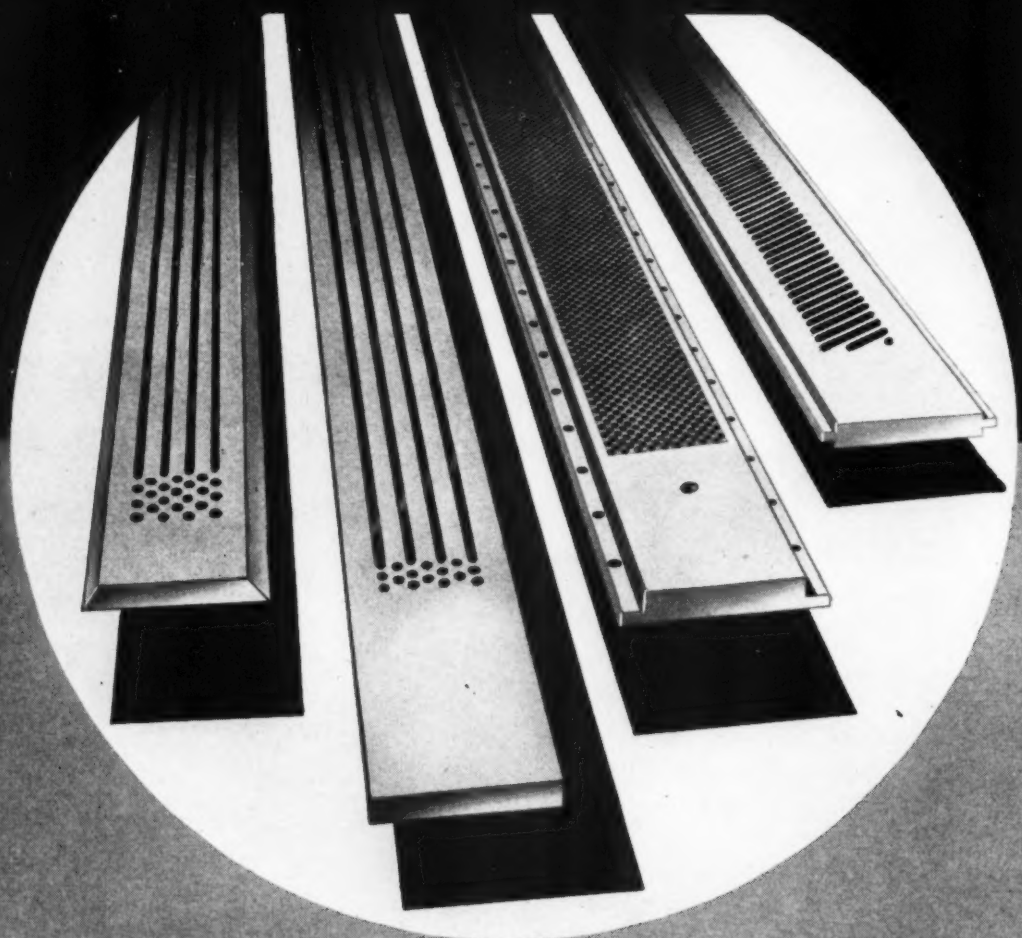
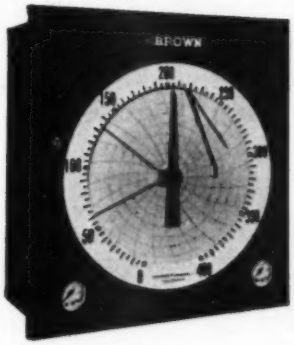


For many applications PANELYTE is the ideal material for Suction Box Covers . . . fabricated in any pattern of holes or slots, either duplicating existing covers or new patterns developed through co-operation of Lodding Engineering Corporation, Worcester, Massachusetts, makers of Lodding Doctors. Represented outside New England by W. E. Greene Corporation, Woolworth Building, New York.

...one way or another



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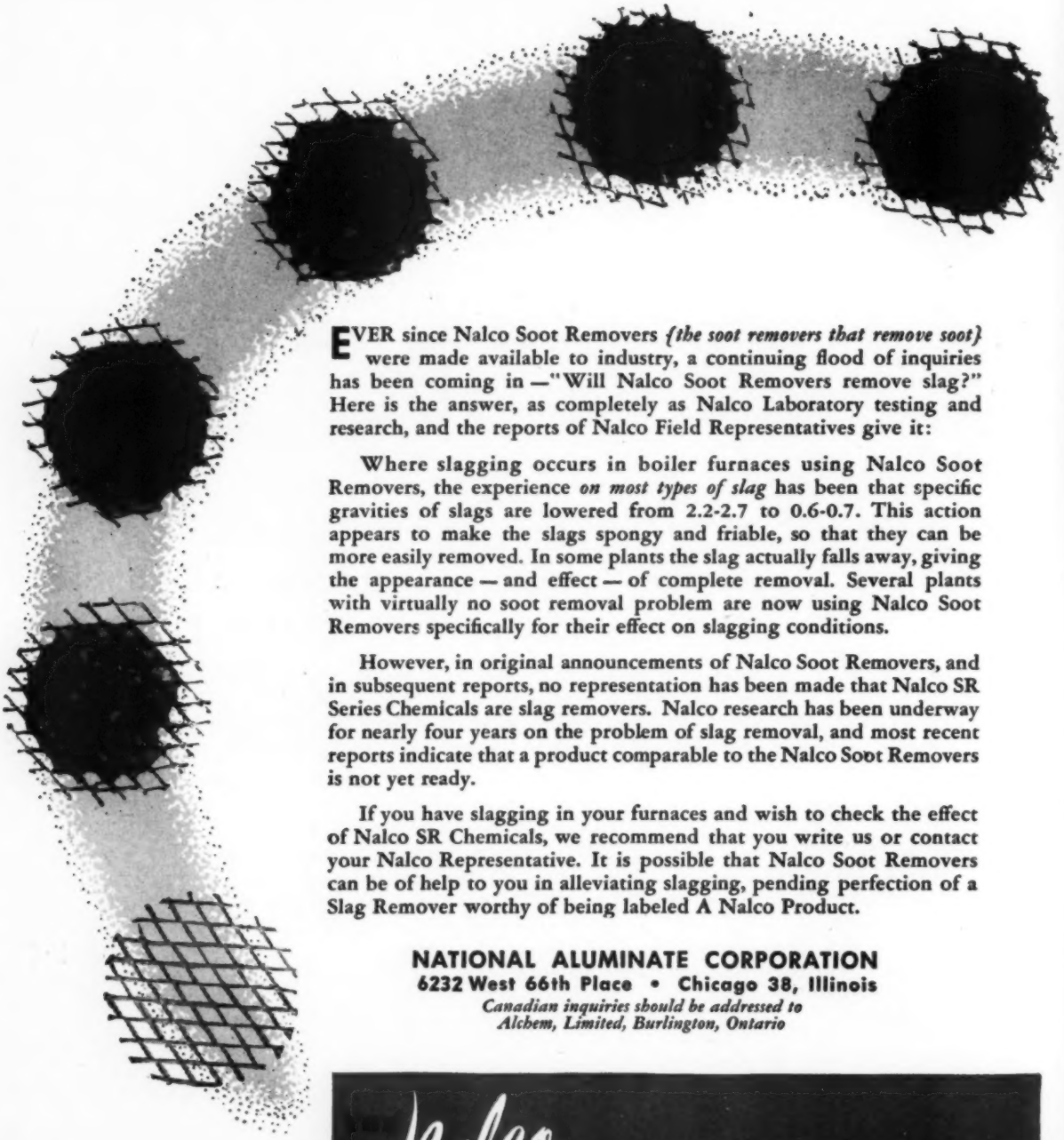
DO *Nalco* SOOT REMOVERS REMOVE **SLAG?**



EVER since Nalco Soot Removers *{the soot removers that remove soot}* were made available to industry, a continuing flood of inquiries has been coming in—"Will Nalco Soot Removers remove slag?" Here is the answer, as completely as Nalco Laboratory testing and research, and the reports of Nalco Field Representatives give it:

Where slagging occurs in boiler furnaces using Nalco Soot Removers, the experience *on most types of slag* has been that specific gravities of slags are lowered from 2.2-2.7 to 0.6-0.7. This action appears to make the slags spongy and friable, so that they can be more easily removed. In some plants the slag actually falls away, giving the appearance — and effect — of complete removal. Several plants with virtually no soot removal problem are now using Nalco Soot Removers specifically for their effect on slagging conditions.

However, in original announcements of Nalco Soot Removers, and in subsequent reports, no representation has been made that Nalco SR Series Chemicals are slag removers. Nalco research has been underway for nearly four years on the problem of slag removal, and most recent reports indicate that a product comparable to the Nalco Soot Removers is not yet ready.

If you have slagging in your furnaces and wish to check the effect of Nalco SR Chemicals, we recommend that you write us or contact your Nalco Representative. It is possible that Nalco Soot Removers can be of help to you in alleviating slagging, pending perfection of a Slag Remover worthy of being labeled A Nalco Product.

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SUTHERLAND

NEW FIBRE PRESS SLASHES PULP COST!

Typical board plant eliminates all breaker beaters and 5 finishing beaters---SAVES 540 HP!

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This one new machine, the FULTON Fibre Press, not only replaces several different operations formerly required, but can cut your costs still further by increased efficiency in these additional applications:

THE FULTON FIBRE PRESS IS AMAZINGLY VERSATILE

- Cuts raw straw
- De-waters and wrings cooked pulp
- Concentrates black liquors
- Simplifies chemical recovery
- Reduces load on refiners
- Minimizes stream pollution
- Improves fibre separation
- Aids in washing, bleaching, wringing wood chips —and many other applications

Check these profit-building advantages

Permits *continuous* instead of batch operation—saves manpower and handling equipment

Cracks and flattens straw nodes during cutting—eliminates dust and maintenance problems

Assures faster and easier chemical imbibition—substantially reduces cooking time

More efficient washing of cooked pulp eliminates need for breaker beaters and most finishing beaters

Concentrates effluent cooking liquors for treatment or chemical recovery to reduce stream pollution.

FULTON FIBRE PRESS

A FULTON Fibre Press at our plant is at your disposal—*without obligation*—for testing its cost-saving and quality-improving features. For complete information, phone, wire or write:

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New Eastern Facilities For Peerless Pump Division On Huge Site At Indianapolis

INDIANAPOLIS, IND.—Peerless Pump Division's new Indianapolis works is the former Fall Creek Ordnance Works and was acquired both for its adaptability to Peerless' long studied and applied production line for manufacture of pumps and for its strategic geographical location for quick customer service. The existing plant, based on 50 ft. x 20 ft. steel column spacing was well adapted to the setting up for high manufacture volume of pump units. Approximately 261,000 square feet of floor space (6 acres under roof) is contained in the main manufacturing building. Auxiliary building for production control, shower and locker facilities for 1200 employees, main offices, dispensary, etc. adds many thousands of square footage. Included in the main building are 24 cranes of 2 and 5 tons capacity capable of operating the entire range of each of the six 50 foot bays. Spur tracks enter both north and south sides of main factory building. A complete and rounded complement of the most modern machinery has been assembled to build up one of the most accurate and finest industrial machine shops.

NEWEST PUMP FACTORY IN THE U. S. GEARED TO HIGH SPEED PRODUCTION OF HORIZONTAL AND VERTICAL PUMPS

Peerless Pump plant at Indianapolis, Indiana

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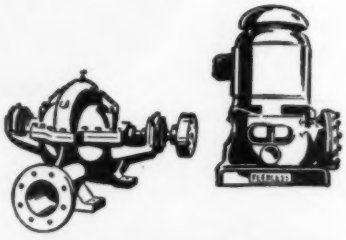

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FOOD MACHINERY AND CHEMICAL CORPORATION
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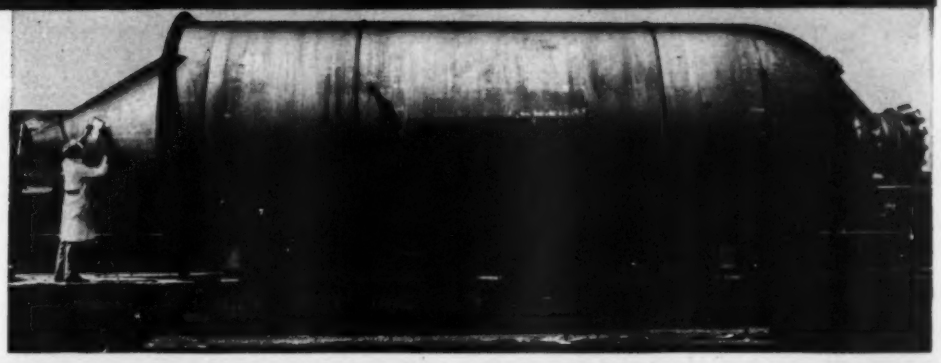
NEWS

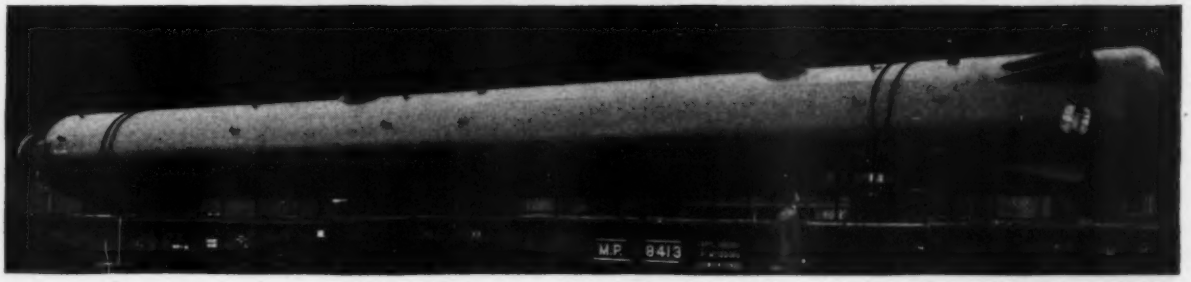
A. O. SMITH Corporation

75th ANNIVERSARY 1874 - 1949

New York 17 • Philadelphia 3 • Pittsburgh 19 • Atlanta 3 • Chicago 4
Tulsa 3 • Dallas 1 • Houston 2 • Seattle 1 • Los Angeles 14
International Division: Milwaukee 1

VESSEL LIFE INSURANCE. Before this SMITH-lined Paper Mill Digester was manufactured, an extensive and comprehensive testing program was completed to be sure the proper alloy lining was selected for the corrosive service. An experimental digester was built and a great many "cooks" were run before the final decision was made.





USING SMITHway MULTI-LAYER CONSTRUCTION WAS MORE ECONOMICAL than single-plate construction in the manufacture of this 72 in. dia. by 80 ft. long water scrubber, at the same time providing a safer construction.

CONSISTENT QUALITY OF SMITHway ELECTRODES used in the manufacture of SMITHway Pressure Vessels is preserved by meticulous control procedures. By means of this X-ray diffraction machine, all raw materials used in electrode coating are checked for the presence of any foreign materials or impurities.

FIELD ASSEMBLY COSTS CUT TO A MINIMUM. The SMITHway is to do the maximum amount of work possible in the shop on vessels too big to be shipped in one piece. All the shell courses on this 15 ft. dia. by 113 ft. long SMITHway Atmospheric Tower were tacked together in the shop to get more accurate and complete installation of the internals.

SEND FOR THESE NEW BULLETINS

Write the nearest A. O. Smith office (see list at top of page) for these newest Vessel Bulletins:

•

FIELD ASSEMBLY OF PRESSURE VESSELS—Bulletin V-44.

•

SMITHway VESSELS — Alloy, Alloy-lined, Clad, and Glass-lined —Bulletin V-46.

TAKES IT AWAY AS FAST AS IT COMES

FROM YARD STORAGE

No matter how your pulpwood arrives at the mill, Jeffrey Chain Conveyors provide a very efficient means of taking it away. Hundreds of installations in mills throughout the Pulp and Paper Industry have proven that these sturdy single or multiple strand conveyors can really take it, and day after day, too.

FROM BARGES

Years of experience in designing and building specialized equipment for handling and processing operations in almost every industry has given Jeffrey engineers the knowledge and skill to recommend the right set-up for YOU. If you want to speed production — improve your handling methods . . . call upon Jeffrey. Do it today.

FROM CARS

THE JEFFREY MANUFACTURING COMPANY

Established 1877

944 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 2	Chicago 1	Detroit 13	Jacksonville 2	Pittsburgh 22
Birmingham 3	Cincinnati 2	Harlan	Milwaukee 2	St. Louis 1
Boston 16	Cleveland 13	Houston 5	New York 7	Salt Lake City 1
Buffalo 2	Denver 2	Huntington 19	Philadelphia 3	Scranton 3

BWH
DEPENDABLE RUGGEDNESS
BOSTON WOVEN HOSE & RUBBER CO.
CONCORD
STEAM #10
BOSTON, MASS.
BWH
1. Tough, long-wearing, abrasion-resistant cover.
2. Asbestos braid insures maximum cover adhesion, and includes NEW type static conducting wire.
3. High-tensile steel wire for strength, for safety.
4. Heat & oil resistant tube.

BWH WIRE BRAID STEAM HOSE CAN REALLY "TAKE IT"

HERE'S PROOF!

Tests in the field show our new Concord #10 Steam Hose is a star performer. It doesn't get stiff and brittle, as some hose does when saturated with scalding steam. It's easy to handle. It's next to scuff-proof, even when banged against machinery and yanked over rough surfaces. But somebody raised another question.

"What happens," they asked, "if this wire-braid hose should be accidentally run over by a truck?"

To answer that question, we deliberately ran a 30-ton truck over our new Concord #10. What did happen? Nothing! The hose kept right on with its trouble-free performance.

Naturally we don't recommend such treatment. But we do say it's compelling proof that our Concord #10 is the last word in sturdiness. Here's what makes this hose outstanding:

1. Same dependably strong, heat and oil resistant tube that has won fame for extra service in BULL DOG Steam Hose.
2. Braids of high-tensile steel wire, heat and pressure resistant.
3. Asbestos braid assures perfect cover adhesion, includes NEW type static-conducting wire.
4. Tough cover, specially designed to resist abrasion and high temperatures.

With these features, it's easy to see why the new Concord #10 meets every need for steam hose that withstands 200 lb. working pressure with SAFETY, does a real job in helping you cut maintenance costs.

☆ ☆ ☆

HAVE YOU A JOB WHERE STAMINA COUNTS?

Bring us your toughest problems. We're specialists in solving them. Consult your nearest BWH distributor or write to us direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all principal cities

PLANT: CAMBRIDGE MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

APPLETON
FELTS
FOR DESIGN AND FINISH!
FOR UNIFORMITY!
FOR SERVICE!
FOR DEPENDABILITY!
STANDARD
APPLETON
FELTS.
AMERICAN WOOL
AMERICAN LABOR
AMERICAN FELTS
APPLETON, WIS.
make
APPLETON FELTS
good
paper
APPLETON WOOLEN MILLS
APPLETON, WISCONSIN

STANORUST
RUST PREVENTIVES
Water-displacement . . . the key to better rust prevention
There is a vast difference between the straight mineral oils and petrolatums, once used for rust prevention, and modern anti-rust products such as the Stanorust line.
One principal difference is the use of an additive in Stanorust Rust Preventives which imparts to them a water-displacement characteristic. (See cut.) This property in part accounts for the greatly superior rust protection afforded by the Stanorust line. The rust preventives replace any moisture on the surface of the part to be protected and form a film which, adhering closely to the metal surface, excludes both air and moisture.
WATER-DISPLACEMENT TESTS illustrating the action of Stanorust No. 4-V on a drop of water placed on a metal surface. (Left) A drop of water on an unprotected steel plate. (Right) The same drop of water, after Stanorust No. 4-V has been applied, illustrating how this rust preventive creeps under and "lifts" the drop of water off the steel surface.
2

Here's the answer to your rust prevention problems

THE BOOKLET illustrated above holds the means to more complete and more economical rust control in your plant. It will help you analyze your rust prevention problems and needs. It tells how the new, improved Stanorusts now fully meet these needs.

The eight grades of Stanorust are described. They range from a fingerprint remover to a heavy, petrolatum-type product that protects against corrosion under the most severe outdoor exposure for years.

Find out why Stanorusts can mean big savings for you through better rust protection. Send for this booklet. Write for your copy today. Simply address your letter to Standard Oil Company (Ind.), 910 S. Michigan Ave., Chicago 80, Ill.

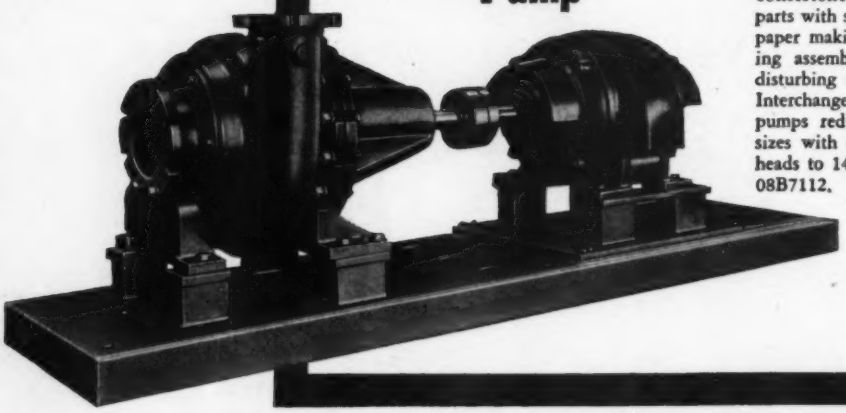
Send for a copy

STANDARD OIL COMPANY (INDIANA) STANDARD

NOW! Pump

IN YOUR MILL...*WITH ONE*

New! "PW" 1. Paper Stock Pump



- Materials to suit your application
- Heavy-duty Construction — Oversize Shaft
- Variable Discharge Nozzle Arrangements

Designed specifically for pumping high consistence pulp. Only four working parts with special alloys to meet toughest paper making applications. Entire rotating assembly can be removed without disturbing suction or discharge piping. Interchangeable parts within different size pumps reduces parts inventories. Eight sizes with capacities 175 to 8000 gpm; heads to 140 ft. . . . Write for Bulletin 08B7112.

YOU CAN GET A COMPLETE "PACKAGED" PUMP — direct or V-Belt driven — from Allis-Chalmers. Coupled with 65 years of centrifugal pump experience, that means undivided responsibility for performance!

And you select from a maximum range of sizes . . . reduce inventories, cut maintenance and service time by standardizing on Allis-Chalmers pumps! A-C engineers can recommend the exact pump for such applications as:

Black, green, white and wash liquors	Digester circulation
Acids, caustics, sizing, colors	Boiler feeding
Corrosive and abrasive fluids	Fire protection
Showers, white water, stock	Sump drainage
Grinder pressure, hydraulic pressure	Condensate and vacuum
Circulation condensers, evaporators	General water supply

For recommendations on *your* applications, or information on how any of the pumps illustrated can help you, contact your nearby Allis-Chalmers sales office, or mail the coupon direct.

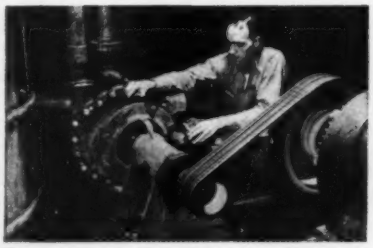
A-C ALLIS-CHALMERS

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment—Biggest of All in Range of Industrial Products

any Liquid or Solid

OF THESE ALLIS-CHALMERS PUMPS!



2. PROCESS PUMPS

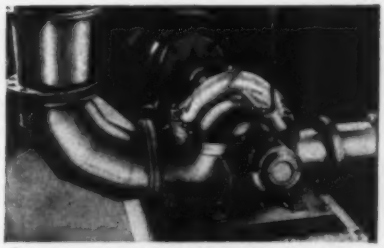
- Pump highly corrosive liquors
- Fewer parts to stock
- Low operating cost

Solution to your corrosive and abrasive liquor pumping problems. Greater metal thickness, larger shaft and bearings for heavy duty. Five sizes with capacities 10 to 1300 gpm; heads to 275 ft. Write for Bulletin 08B6615A.

3. CLOSE-COUPLED PUMPS

- Motor integral part of unit
- Parts readily accessible
- Eight discharge nozzle arrangements

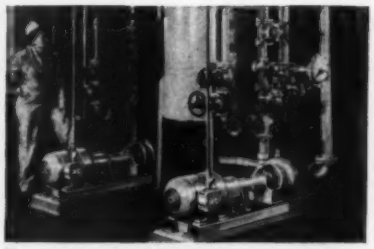
Close-coupled, single-suction, single stage pumps for non-abrasive fluids. Quickly installed; operated in almost any position. Available in standard ratings up to 2500 gpm and 550 ft heads. Bulletin 52B6140A.



4. GENERAL PURPOSE "S" PUMPS

- Complete range of sizes
- Built to customers requirements
- Use any type drive

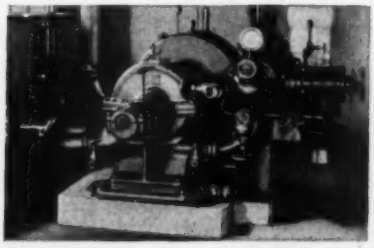
For general water supply, circulating, gathering and drainage. Capacities 30 to over 170,000 gpm; heads to 450 ft. Construction material varies with liquid pumped. Horizontal or vertical mounting. Bulletin B6146.



5. GENERAL PURPOSE "SS-B" PUMPS

- 234 standard ratings
- Pedestal type pumps
- Horizontal or vertical position

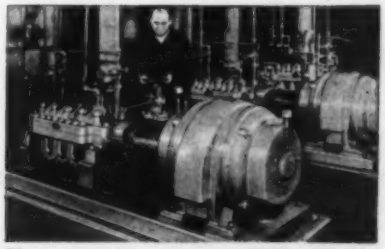
Single-suction, base mounted pumps for use where close-coupled pumps are not practical. Driven by electric motors, steam turbines, gasoline or diesel engines . . . direct connected or V-Belt drive. Capacities 10 to 2500 gpm; heads to 450 ft. Bulletin B6351.



6. FIRE PUMPS

- Approved fire-fittings
- Lower insurance risk
- Splash-proof motors

For efficient, low-cost fire protection. Single-stage, double suction centrifugal fire and booster pumps for heads 60 to 125 psi; capacities 500 to 1500 gpm. Approved by fire insurance Underwriters for most ratings. Bulletin 08B6336A.



7. POWER PLANT PUMPS

- Low-cost operation
- Every pump factory tested
- Choose from complete line

Allis-Chalmers can fill any power plant need. Line includes boiler feed, circulating, condensate removal, heater drain, service water, wash water, feedwater, evaporator feed, boiler recirculating and ash sluicing. Write for Bulletin 52B6059E.

SEND COUPON FOR HELPFUL BULLETINS

ALLIS-CHALMERS, 991A SO. 70 ST. A 2694
MILWAUKEE, WIS.

Please send following bulletins.....

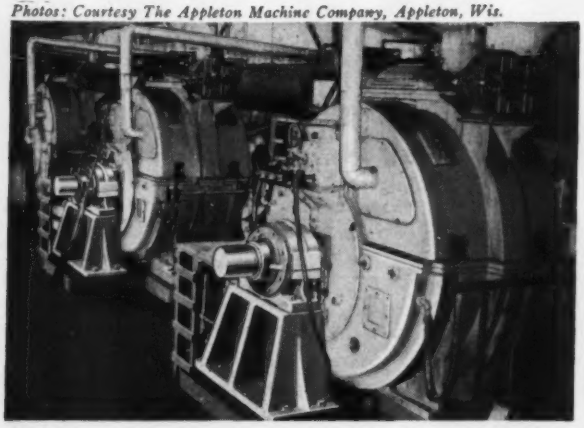
Name.....

Title..... Company.....

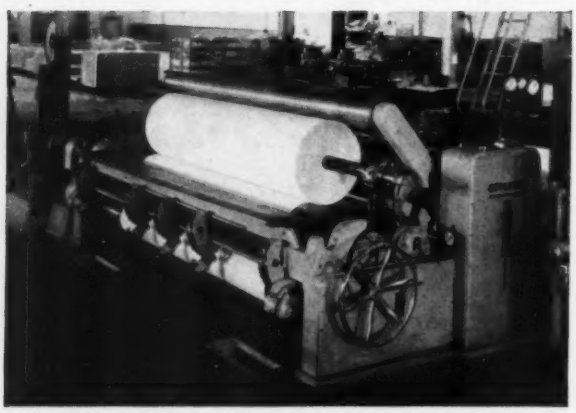
Address..... City.....

Torrington Bearings
Set a Steady Pace of Production
In Appleton Paper Mill Equipment

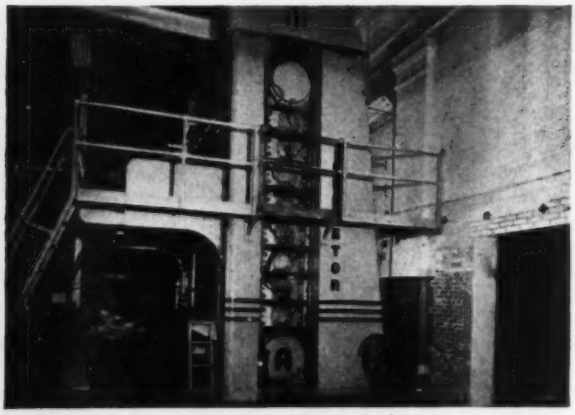
Photos: Courtesy The Appleton Machine Company, Appleton, Wis.



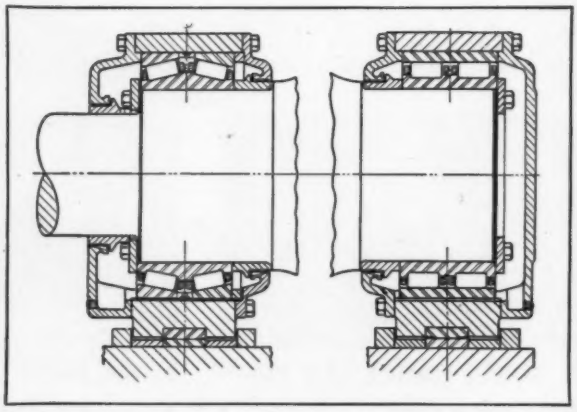
Continuous pulp production is an important feature of the Roberts Grinder. Appleton Machine Company uses Torrington Spherical Roller Bearings on the stone shaft for reliable performance at this 'round-the-clock pace. These bearings help grinders produce 50 tons of pulp a day.



Appleton Winder drum rolls are also equipped with Spherical Roller Bearings. Despite the 154" center distance between housings, accurate alignment is easy to secure. End play is eliminated. Drum rolls run free and true under heavy reels, and require a minimum of maintenance attention.



Appleton Supercalenders, too, benefit from the reliable performance of Torrington Bearings. On intermediate rolls, Spherical Roller Bearings permit rapid acceleration, eliminate roll crowding, web breakage and oil leakage. Production is speeded and paper caliper and finish improved.

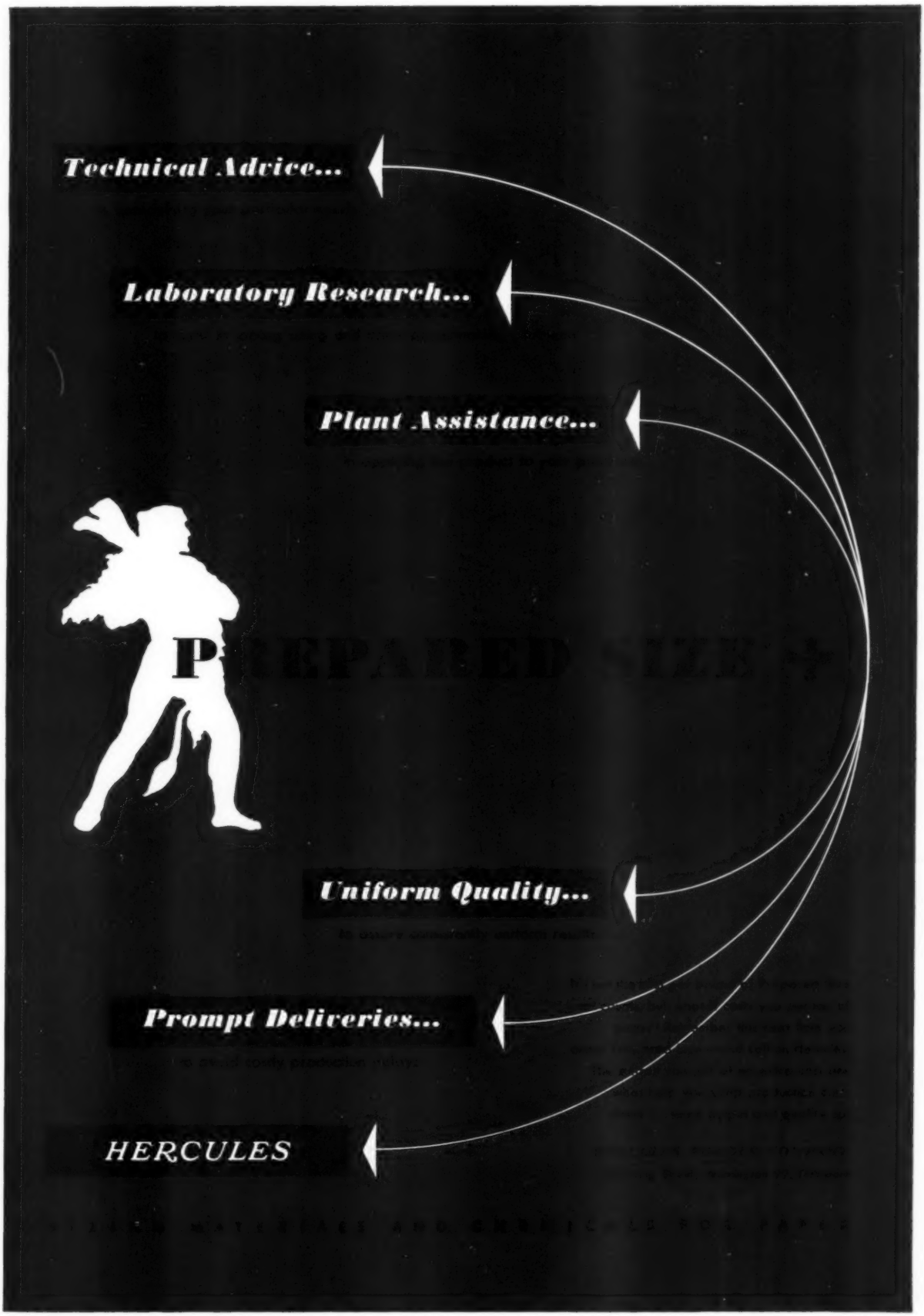


This cross-section shows the design employed on Supercalender top and bottom rolls. A Torrington Tapered Roller Bearing at the rear accurately locates the roll axially. The front end "floats" through a Torrington Straight Roller Bearing, allowing free roll expansion and contraction.

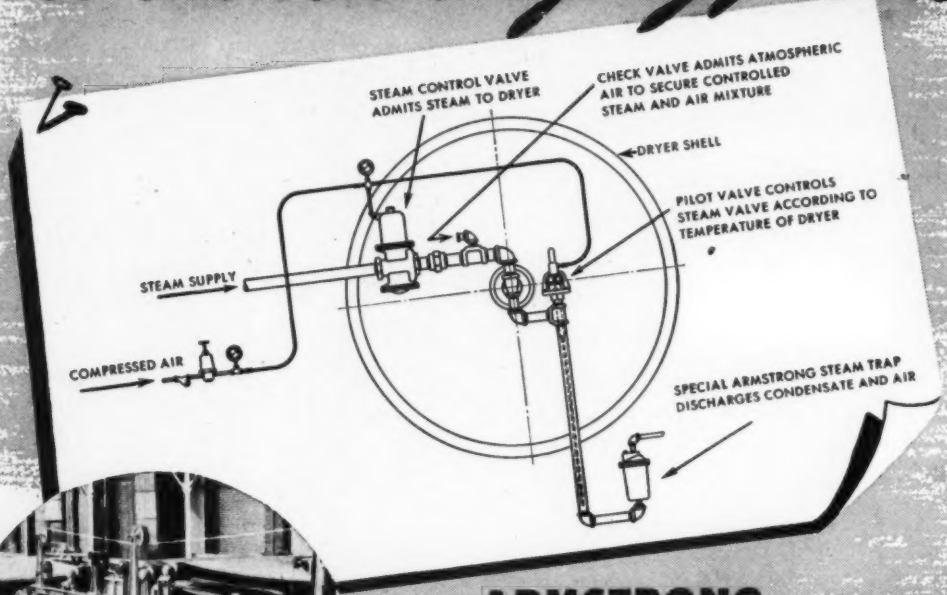
You can rely on equipment using Torrington Bearings to work to peak capacity, with minimum down time and low maintenance costs. Our engineers will gladly apply their experience with every major type of anti-friction bearing to your friction problems. Write us today. THE TORRINGTON COMPANY, South Bend 21, Ind., or Torrington, Conn. District offices and distributors in principal cities of United States and Canada.

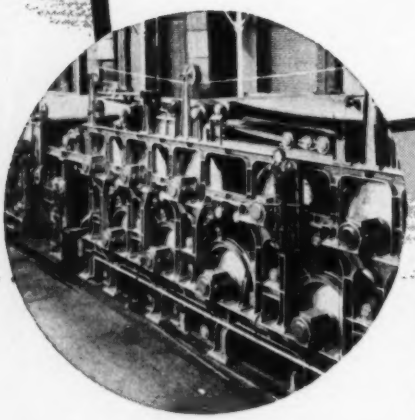
TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Straight Roller Needle • Ball • Needle Rollers


Technical Advice...
Laboratory Research...
Plant Assistance...
P
Uniform Quality...
Prompt Deliveries...
HERCULES

A NEW ANSWER
to an old drying problem


STEAM CONTROL VALVE ADMITS STEAM TO DRYER
CHECK VALVE ADMITS ATMOSPHERIC AIR TO SECURE CONTROLLED STEAM AND AIR MIXTURE
DRYER SHELL
PILOT VALVE CONTROLS STEAM VALVE ACCORDING TO TEMPERATURE OF DRYER
STEAM SUPPLY
COMPRESSED AIR
SPECIAL ARMSTRONG STEAM TRAP DISCHARGES CONDENSATE AND AIR



ARMSTRONG
Individual Dryer
TEMPERATURE CONTROL

- CONTROLLED MIXTURE OF STEAM AND AIR MAINTAINS REDUCED TEMPERATURES
- EACH DRYER CONTROLLED INDEPENDENTLY
- ACCURATE AND UNIFORM
- 100° F TO 250° F RANGE
- DEPENDABLE
- COMPLETELY AUTOMATIC
- PROVEN AND GUARANTEED

Eliminates Picking and Curling

ARMSTRONG Individual Dryer Temperature Controls are used to accurately maintain reduced temperatures in the first four or five dryers at the wet end of a paper machine. This keeps the paper from sticking to the surface of the dryer and prevents curling due to over-drying one side of the sheet. Each dryer is controlled independently of any other dryer and can be regulated at any point from 100° to 250° F. Temperatures below 212° F are secured by controlling a mixture of steam and air in the dryer. Above 212° F, no air is mixed with the steam and control is entirely by steam pressure.

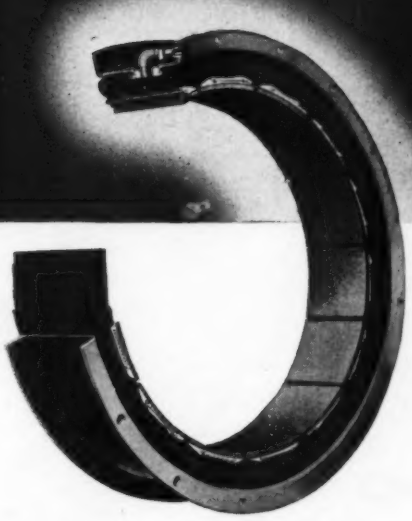
The Armstrong Control is simple, dependable, and guaranteed to give satisfaction. For complete information write for BULLETIN 187 which fully describes the principle of operation and the component parts of the control.

ARMSTRONG MACHINE WORKS
816 Hoffman Street, Three Rivers, Mich.

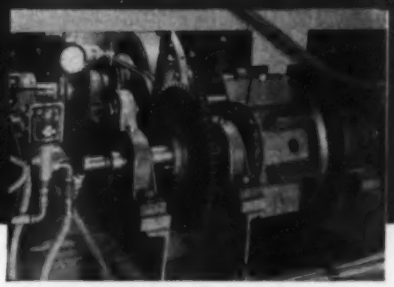
INVERTED BUCKET STEAM TRAPS • PAPER MILL SPECIALTIES

ONLY ONE MOVING PART

in this Fawick Clutch

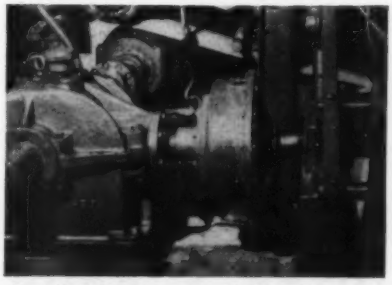


Fawick Airflex Clutch or Brake Type CB



Fawick Airflex elements used as tandem slip, forward, and reversing clutches on Automatic Roofing Paper Machine by Roofing Machinery Manufacturing Co., Chicago, Ill.

Fawick Airflex element used on Dryer Drive at Crane & Co., Dalton, Mass.



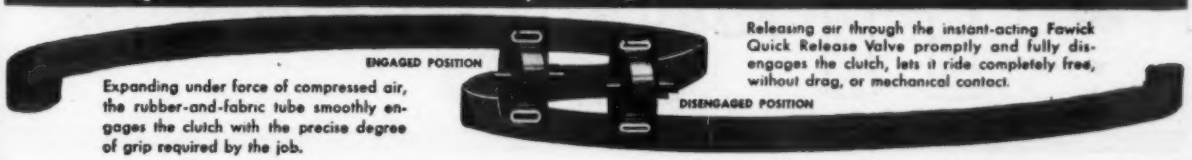
Fawick Airflex element used on Suction Press Drive at Crane & Co., Dalton, Mass.

The rubber-and-fabric pneumatic tube faced with friction shoe assemblies is the only moving part in this Fawick Clutch. This part naturally stays in perfect adjustment at all times—automatically compensating for wear of the friction shoes.

Job-tested, Fawick Clutches meet the toughest operating conditions in many fields—petroleum, earth-moving, metalworking, rubber, paper, pulp and others.

Write our engineering department for a recommendation of the Fawick elements best suited for your machines. Address Dept. PI.

FAWICK Airflex CO., INC.



Expanding under force of compressed air, the rubber-and-fabric tube smoothly engages the clutch with the precise degree of grip required by the job.

Releasing air through the instant-acting Fawick Quick Release Valve promptly and fully disengages the clutch, lets it ride completely free, without drag, or mechanical contact.

ARE YOU *"the Goat"*?

Now that paper is no longer in short supply buyers are refusing to accept poor quality. They find fault with the sales manager and he makes the superintendent the "goat."

But, is it your fault?

You are as careful as ever about the correct materials, proper stock preparation at the beaters, Jordans and screens. You keep your press rolls accurately ground and adjusted. You are getting good results from the felts at your first press.

What about the second and third presses? Are you using Hamilton plate and super plate felts to give your sheets a quality finish? We make them for every finishing requirement of the paper industry.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

Du Pont Announces ALATHON™ Polythene Resins

New paper coating materials with many unusual features

"ALATHON" PAPER COATINGS ARE:

STRONG—TOUGH—GLOSSY
NON-BLOCKING
WATER-RESISTANT
CHEMICAL-RESISTANT
SOLVENT-RESISTANT
FLEXIBLE AT LOW TEMPERATURES
LOW IN M.V.T.R.
TASTELESS—ODORLESS
NON-TOXIC

USE "ALATHON" FOR:

MULTIWALL PAPER BAGS
MILK CONTAINERS
FROZEN FOODS PACKAGES
HOT-DRINK CUPS
BUTTER CARTONS
BAKERY TRAYS
AND OTHERS

Now—"Alathon" Polythene Resin coatings make paper resistant to water, acids, alkalis, solvents, caustics, fertilizers, cement, surface active agents, vegetable oils, hot beverages and many other substances. Bags and containers coated with new "Alathon" have maximum heat seal strength . . . successfully resist materials that could never before be packaged in paper alone. Bend it! . . . Crease it! . . . Abuse it!—Paper coated with "Alathon" can take it!

SEND THIS COUPON TODAY for a new booklet on Du Pont "Alathon" Polythene Resins. It gives the latest facts on these new coating materials and their wax blends. We will be glad to work with you in applying "Alathon" in your operations.

P1-1

AMMONIA DEPARTMENT
E. I. du Pont de Nemours & Co. (Inc.)
Wilmington 98, Delaware

Please send me your new booklet on **"Alathon" Polythene Resins.**

Name_____ Title _____

Firm_____

Address_____ State_____

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

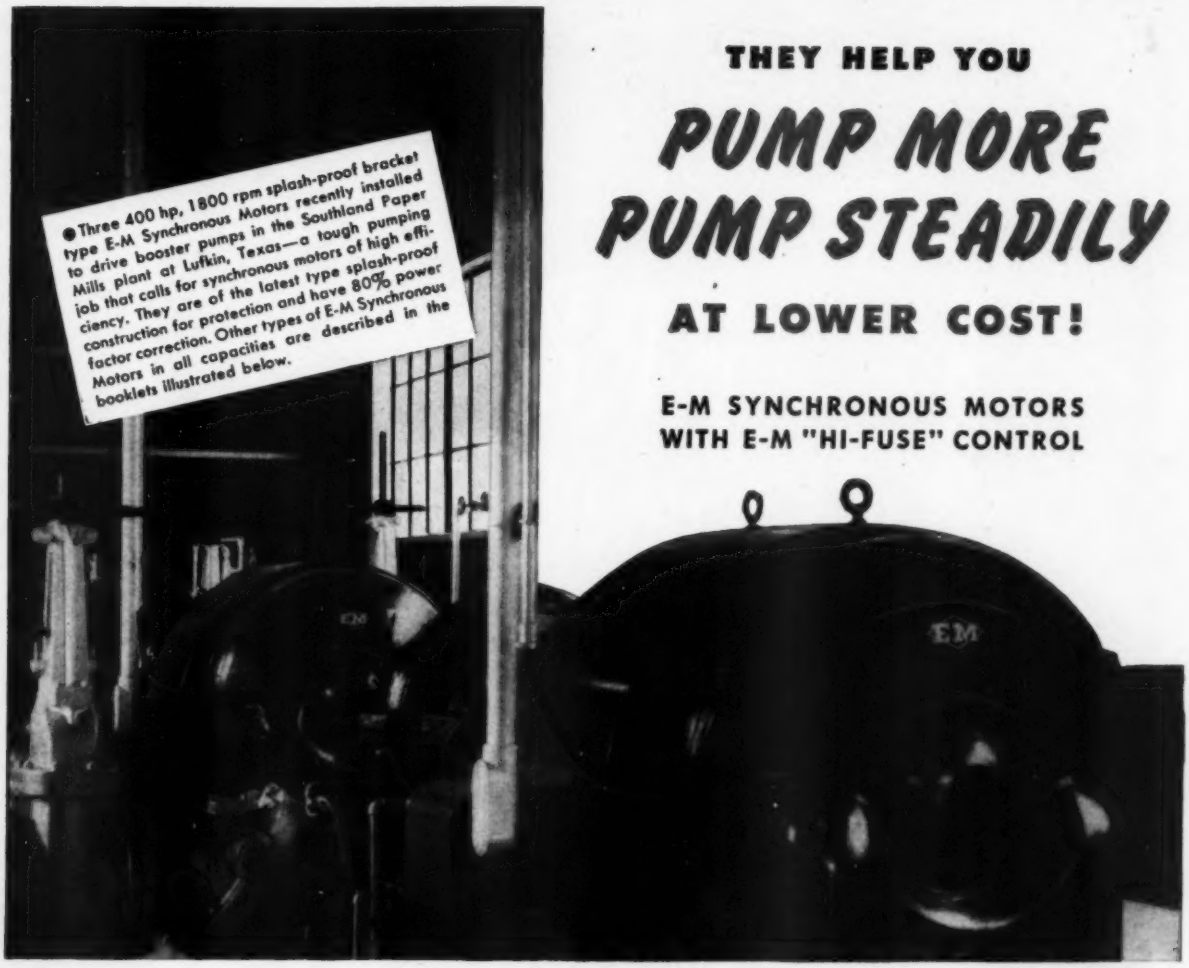
SYMBOL of
HIGHEST QUALITY

B. F. PERKINS & SON, Inc.

ENGINEERS AND MANUFACTURERS

HOLYOKE, MASS.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD


● Three 400 hp, 1800 rpm splash-proof bracket type E-M Synchronous Motors recently installed to drive booster pumps in the Southland Paper Mills plant at Lufkin, Texas—a tough pumping job that calls for synchronous motors of high efficiency. They are of the latest type splash-proof construction for protection and have 80% power factor correction. Other types of E-M Synchronous Motors in all capacities are described in the booklets illustrated below.

THEY HELP YOU

PUMP MORE PUMP STEADILY

AT LOWER COST!

E-M SYNCHRONOUS MOTORS WITH E-M "HI-FUSE" CONTROL

Here are three great, high production money-saving performers at work . . . E-M Synchronous Motors driving centrifugal pumps. Together with their E-M "Hi-Fuse" Control they are making possible a more dependable and economical conversion of electrical power into mechanical energy on pumping and hundreds of other big jobs throughout America.

PUMP MORE—E-M Synchronous Motors are the first choice for volume production on jobs such as pumping which require constant-speed drives. Unaffected by lower voltage due to line loss and voltage dips, these constant-speed motors assure you of maximum pumping capacity.

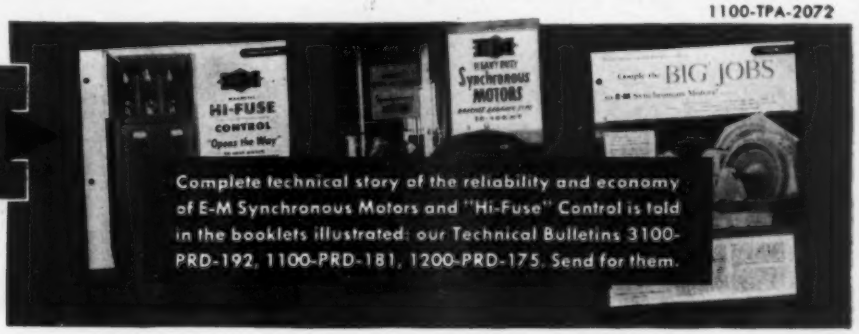
PUMP STEADILY—E-M Synchronous Motors are engineered to give steady, uninterrupted service on the toughest jobs month after month. Cool-running, ruggedly built to the requirements of the job they minimize production losses from shut downs. Protective drip-proof or splash-proof construction gives added insurance against production interruptions. Short-circuit protection far above the rated current interruption capacity of the standard control is provided by E-M "Hi-Fuse" Control.

AT LOWER COST—Economy in the use of electrical power is inherent in the E-M Synchronous Motor, with its direct connection to the load and its power factor correction. And it provides for trouble-free operation that reduces maintenance costs to a minimum. E-M engineering know-how insures proper starting characteristics, with pull-in and pull-out torques to match load requirements.

ELECTRIC MACHINERY MFG. COMPANY

821 SECOND AVENUE S. E., MINNEAPOLIS 13, MINNESOTA

1100-TPA-2072



Complete technical story of the reliability and economy of E-M Synchronous Motors and "Hi-Fuse" Control is told in the booklets illustrated: our Technical Bulletins 3100-PRD-192, 1100-PRD-181, 1200-PRD-175. Send for them.

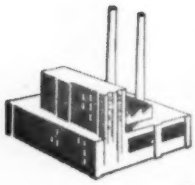
Specialists In "Big Motor" Engineering

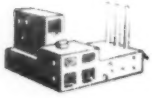
P.P.&E.
Corrugated Tangents

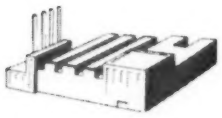
—for Maximum Flexibility where space is limited...

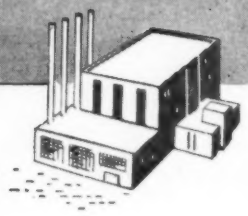
The flexibility of a P.P.&E. Corrugated Tangent is much greater than a straight pipe of equal length, diameter, and wall thickness. This inherent flexibility minimizes stresses resulting from thermal expansion, and reduces end reaction against equipment.

Corrugated tangents can be prefabricated by us in any practical design. Used alone, or together with P.P.&E. Creased Bends, they make practicable the installation of a complex system where space is at a premium.

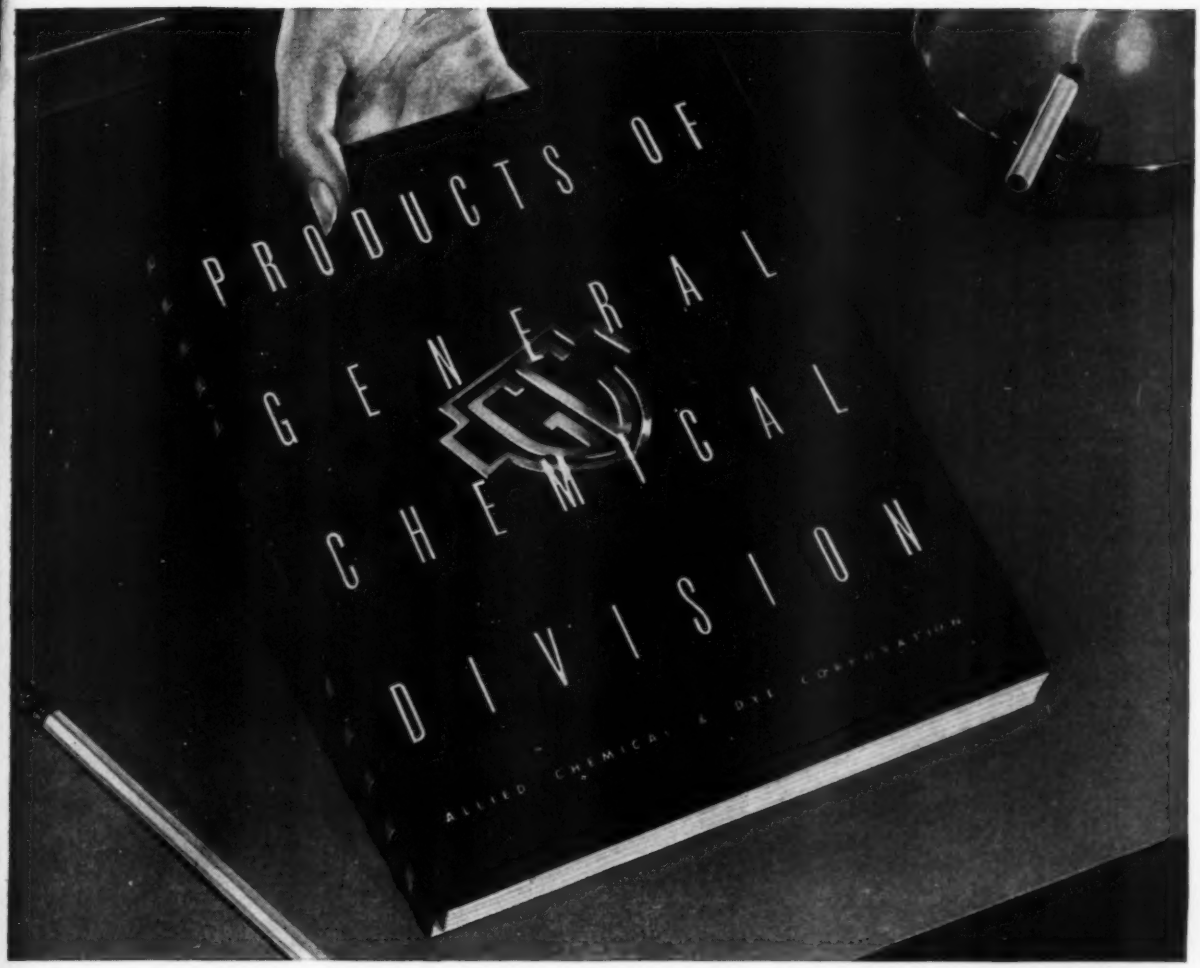








Pittsburgh Piping
AND EQUIPMENT COMPANY
10 Forty-Third Street — Pittsburgh, Penna.



NOW AVAILABLE • • • this New, Complete Guide for Users of Industrial Chemicals

Once again General Chemical offers its outstanding Products Book . . . an invaluable reference and guide for every buyer of industrial chemicals and those who direct their use in research and manufacture.

Here are 176 pages packed with facts and figures on the products which General Chemical produces for the process industries. It gives pertinent data on their physical properties, uses, packaging, shipping regulations, etc. Also covered are General's new organic chemicals for industry and agriculture as well as its broad and varied line of fine chemicals for process use.

As in the past, the reader has an extensive "reference section" to draw upon for technical data. At his finger tips are 65 pages of tables, charts and factors of lasting practical value . . . many of which are not available elsewhere! Included, too, is the latest comprehensive information on handling and storing major industrial chemicals.

Every qualified buyer or user of industrial chemicals should have the General Chemical Products Book on his desk. You will refer to it continuously . . . and you will come to depend upon it for authentic information. For your copy, send request on your business letterhead to:

BASIC CHEMICALS
GC
FOR AMERICAN INDUSTRY

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
OFFICES IN PRINCIPAL CITIES

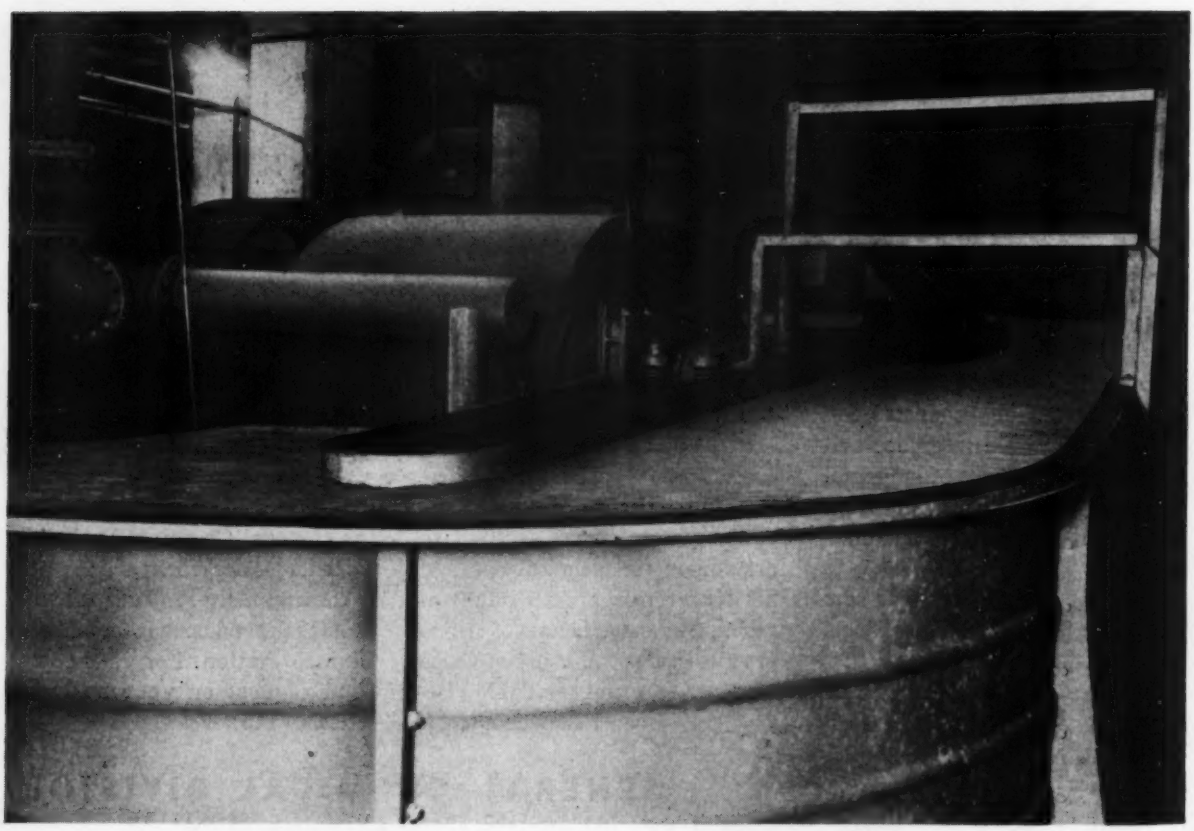
3 Easy Lessons in handling broke

by Broke Beater Ben

1 **Keep your flybars roughened up!**

2 **Buy your broke beater big enough . . . remember those slabs!**

3 **BUY YOUR BROKE BEATER FROM VALLEY**

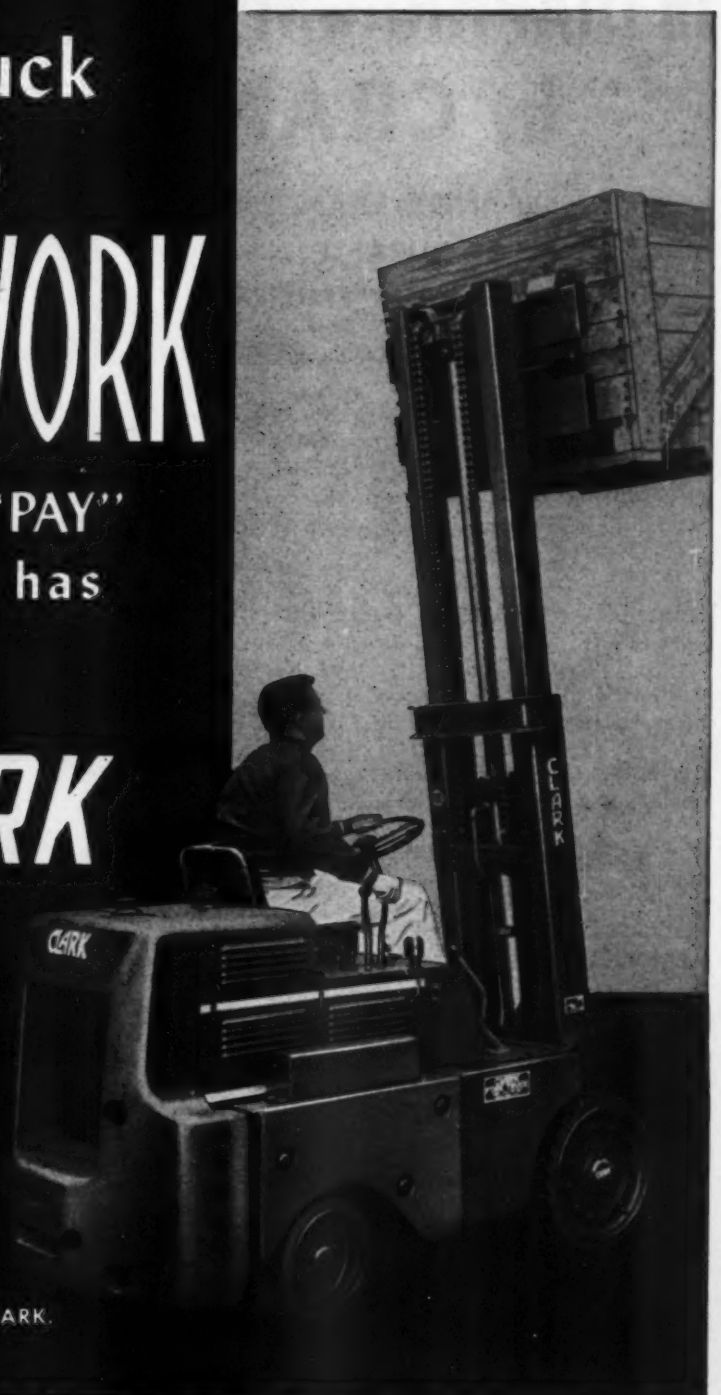


Write the VALLEY IRON WORKS CO., Appleton, Wisconsin

This Fork Truck DOES MORE WORK

FOR LESS "PAY" because it has

DYNA TORK *Drive*



Available *only* in CLARK'S gasoline-powered Utilitruc, DYNATORK DRIVE eliminates the clutch and conventional transmission. Nothing comparable in the fork-lift-truck field. Benefits so numerous that the important question is: CAN YOU AFFORD TO BE WITHOUT IT?

To help get the answer—to enjoy unsurpassed counsel on any materials-handling matters—CONSULT CLARK. Please direct inquiries on your business letterhead to address listed below.

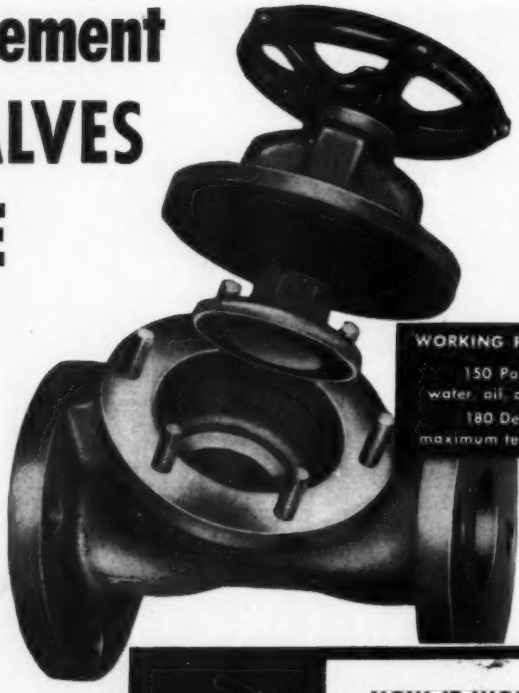
INDUSTRIAL TRUCK DIVISION

CLARK EQUIPMENT COMPANY

BATTLE CREEK 22, MICHIGAN

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

outstanding improvement in DIAPHRAGM VALVES by CRANE



NEW SEATING ARRANGEMENT MORE DURABLE... SAFER... MORE EFFICIENT

Now, after completing exhaustive tests, Crane presents this better diaphragm valve—better suited for more services under today's working conditions. Stemming from basic improvements, such as the radically new bonnet-sealing and valve-seating arrangement, this original Crane design introduces many outstanding service features like those shown here.

1. LONGER DIAPHRAGM LIFE, because diaphragm is used *only* to seal the bonnet—not for seating purposes.

2. POSITIVE SHUT-OFF in case of diaphragm failure. This is an exclusive Crane safety feature.

3. ACCURATE SEATING—new flat face disc with durable, resilient seating surface assures tight closure on all fluids.

4. GREATER FLOW CAPACITY with reduced resistance and pressure drop, assured by Crane Y-pattern body design.

5. EASIER OPERATION—Crane separate disc and diaphragm construction takes less torque—fewer turns—to operate.

HOW IT WORKS

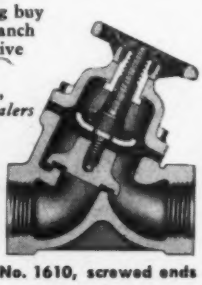
The Crane diaphragm serves one function only—sealing the bonnet. It is not subject to crushing and rapid wear. The seating member is a separate circular flat face disc, firmly attached to the stem and joined to the diaphragm with a special leakproof connection. This independent seating feature permits positive shut-off with no loss of fluid, even in case of diaphragm failure.

GET THIS DESCRIPTIVE CATALOG

See these new valves—the outstanding buy in their class—at your local Crane Branch or Wholesaler. Or write for descriptive catalog AD-1761.

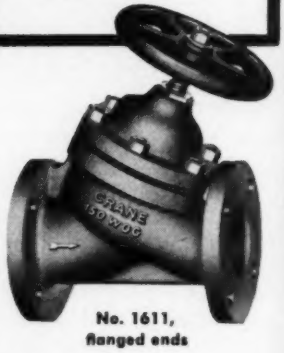
CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

This new Crane line includes iron valves with screwed ends in sizes ½ to 2 in.; with flanged ends from ½ to 4 in. Neoprene coated valves—flanged ends only—in sizes from ½ to 4 in.



No. 1610, screwed ends

No. 1615, flanged ends, neoprene coated



No. 1611, flanged ends

EVERYTHING FROM . . .

VALVES
FITTINGS
PIPE

CRANE

PLUMBING
AND
HEATING

FOR EVERY PIPING SYSTEM

Why Engineered

No single type of dryer felt will meet the needs of all mills. But HOOPERWOOD "Canvas Engineering" has the answer to that problem—a specific HOOPERWOOD Dryer Felt for each requirement.

If it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an Asbestos Felt to withstand advanced temperatures in high speed production of Kraft and other heavy papers—there is a HOOPERWOOD felt to fit your need.

Mill Superintendents find this service invaluable in suiting the particular requirements of their mill—even down to each machine position if desired.

Make your next felt *right*—specify HOOPERWOOD.

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

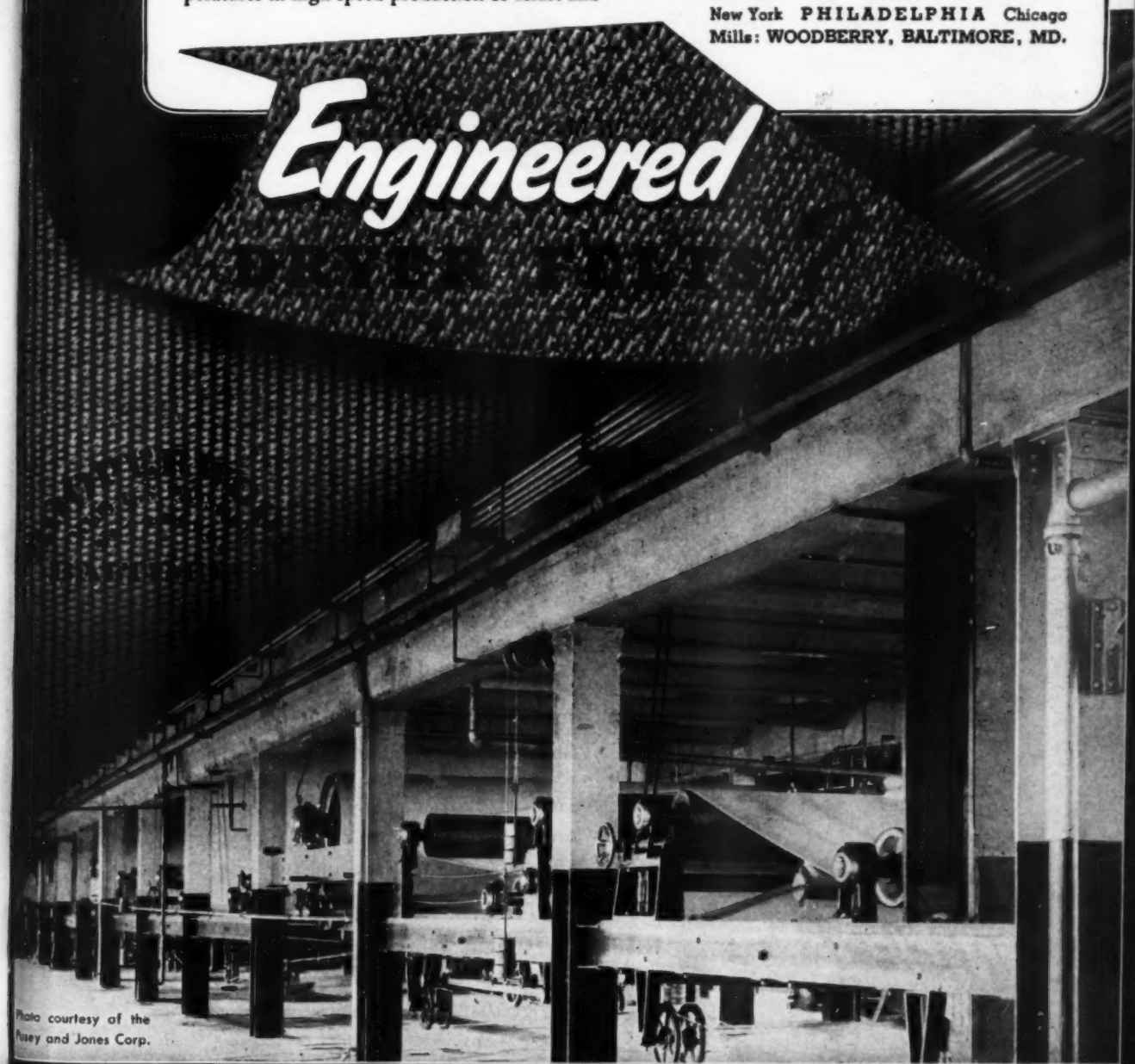
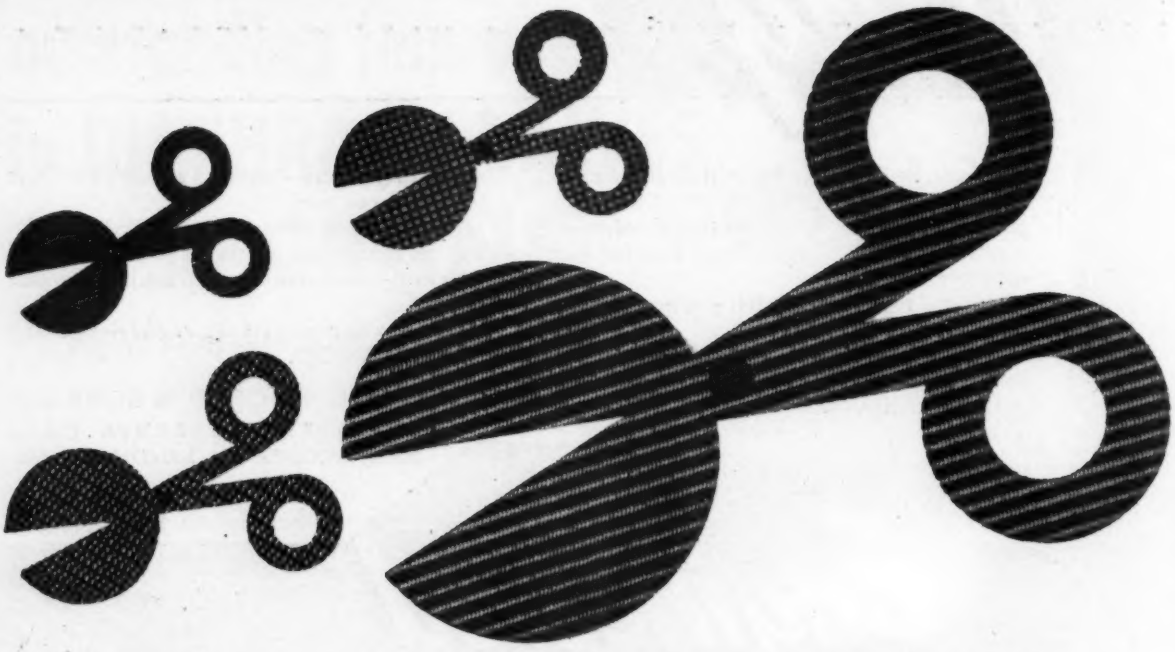


Photo courtesy of the Pusey and Jones Corp.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS



This Screen and Filter Cloth may help you cut costs!

YOU save money two ways when you replace troublesome fabric or metal cloth with wire cloth made of Monel*, Nickel or Inconel*. . . the "task metals" of industry.

For this long-lasting wire cloth is not expensive. Its prices are comparable to what you are now paying for cloth of less durable metal. *Fine weaves of Monel and Nickel often cost less!*

Add the lower initial cost to the greater service life of the "task metals" and you can readily see the two-fold saving possible.

Wire cloth of Monel, Nickel and Inconel is rustless . . . corrosion-resisting . . . strong . . . tough. It stands abrasive wear. It endures extreme temperatures. It guards product purity.

All weaves and meshes are available for your particular filtering screening or conveying needs.

And it's easy to braze, solder or weld. You're sure to get strong joints that do not deteriorate in service.

Investigate *the "task metals" next time you order wire cloth. Any quality weaver will be glad to recommend types and quote prices. For booklet,* "ESTABLISHED WEAVERS," *write to our Frank Bailey.*

Monel* Nickel Inconel*

"Task Metals" for Industry

EMBLEM OF SERVICE INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

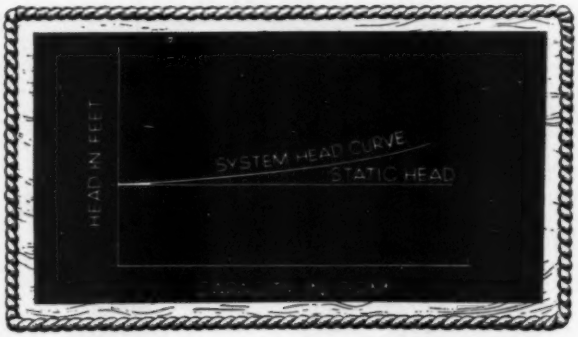
*Reg. U. S. Pat. Off.

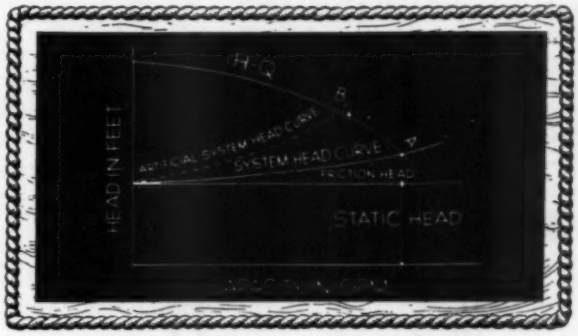
Pointers on Pumps

HOW MUCH WILL A CENTRIFUGAL PUMP DELIVER?

1 The capacity of a constant speed centrifugal pump whose head capacity characteristics (H-Q) are shown in Figure I on any piping system can be determined as follows:

2 Plot the friction loss through all piping, valves and fittings at different rates of flow. Use any standard friction tables, making allowances for age and condition of pipes.





3 Static Head is the difference between liquid levels in suction and discharge vessels plus the algebraic difference of pressure, between suction and discharge vessels, expressed in feet. Combining the friction head curve at different rates of flow with the static head gives the system head curve, which is total head in feet*.

*See method of calculating head described in previous advertisement in this series. We will gladly send you a copy.

4 When the head capacity curve (Figure I) is superimposed on the system head curve, (Figure III) the intersecting point "A" is the capacity that will be delivered by the pump on this system. If a smaller capacity is desired, partial closing of the discharge valve will produce an "artificial" system head curve, giving capacity at point "B". Any capacity between point "A" and shut-off (zero capacity) may be obtained by adjusting discharge valve.

ANY OTHER PROBLEMS?

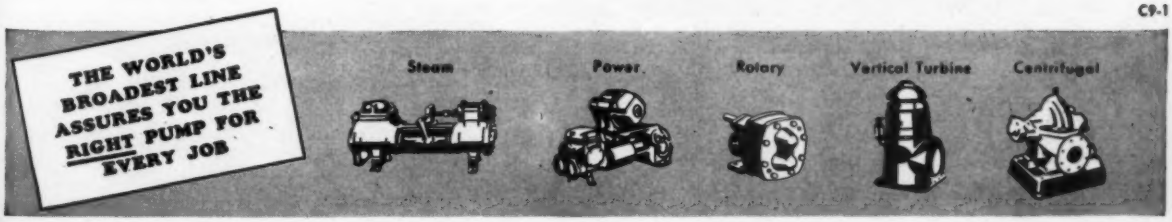
Worthington's engineering department — backed by the longest and broadest experience in the field — will do its best to solve them. Because in addition to making the most complete line of pumps, Worthington makes its technical service fulfill the promise that *there's more worth in Worthington* . . .

Contact our nearest District Office, or write to *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

WORTHINGTON

C9-1

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

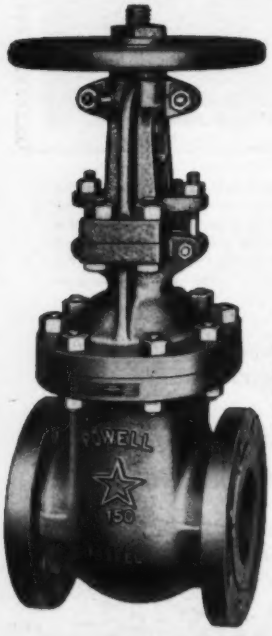


VALVE ACTION PERFECT!
Naturally - they're all
POWELL VALVES

Faulty valve performance can be as serious in the industrial plant as it is in the human heart.

Today, many plants throughout the United States have eliminated valve trouble by standardizing on Powell Valves. That's because, in designing *every* valve in the complete Powell Line, maximum performance at a minimum cost of maintenance has been a prime consideration. Also, because there's a Powell Valve specifically adapted to every known flow control requirement, failures due to misapplication are avoided.

So, whether you're making a new installation or need replacements, be sure to specify Powell Valves. And remember Powell Engineering Service is always at your disposal in selecting the correct valves to meet your individual requirements.



← **Fig. 1503**—Class 150-pound Cast Steel Gate Valve with flanged ends, bolted flanged yoke, outside screw rising stem, tapered solid wedge.

Fig. 1708 — 200-pound Bronze Globe Valve with renewable stainless steel seat and regrindable, renewable "Powellium" nickel-bronze disc. ←

Bellows Sealed "Y" Valve. Powell's Bellows Sealed Valves—Globe and "Y" patterns—are designed for high vacuum service and for installations where packing is unsatisfactory or fails frequently. The bellows is enclosed within the valve body, completely sealing the interior of the valve from the outside atmosphere. Available in 18-8S, 18-8S Mo., Monel Metal, Hastelloy, in sizes ¼" to 12", inclusive.

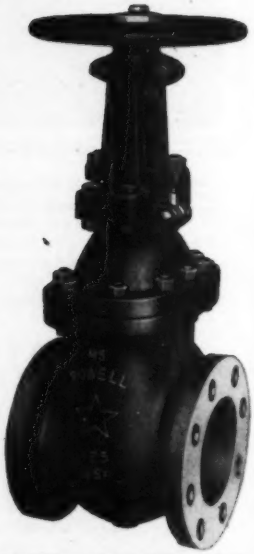


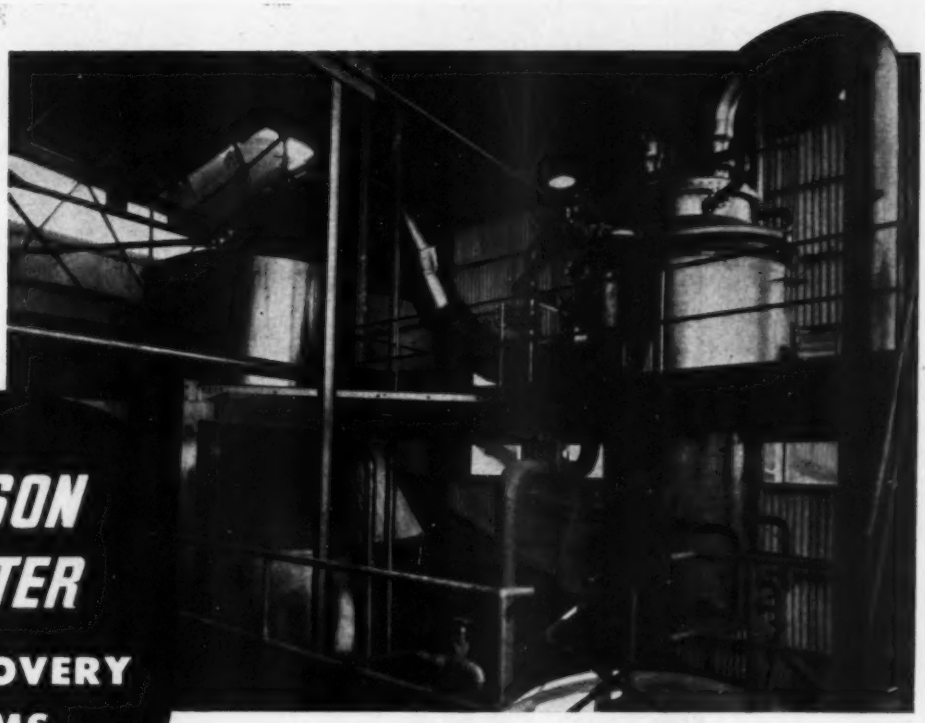
Fig. 1793 — Large 125-pound Iron Body Bronze Mounted Gate Valve. Made in sizes 2" to 30", incl. Has outside screw rising stem, bolted flanged yoke, tapered solid wedge.

Powell Valves are made in Bronze, Iron, Steel and a wide selection of Corrosion-Resistant metals and alloys. Valves of every type—Globe, Angle, Gate, Check, Non-return and Flush Bottom Tank Valves—are included in the Complete Powell Line.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

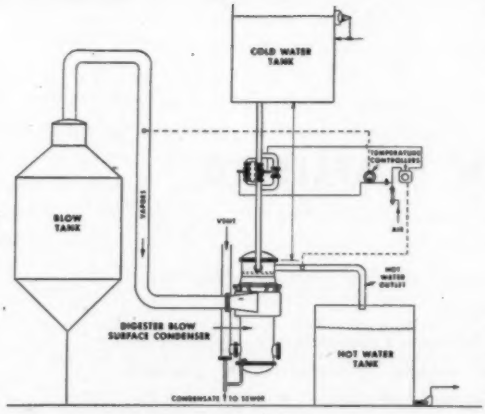


SWENSON DIGESTER HEAT RECOVERY SYSTEMS

Swenson Digester Heat Recovery Systems are designed to provide simplified yet completely automatic operation, in order to obtain maximum heat recovery from the digester blow. The instrumentation is arranged to permit a constant outlet temperature of the clean hot water for mill usage.

Pulp carry-over with the blow steam is prevented from accumulating on the tubes by means of a centrifugal separator built integrally with the condenser.

Swenson Engineers will be glad to discuss your heat recovery problems at your convenience. Send for Bulletin E-108—"Swenson Recovery Equipment for Pulp Mills."



Flow Sheet shows general arrangement of Blow Condenser system.

SWENSON

SWENSON EVAPORATOR COMPANY

DIVISION OF WHITING CORPORATION
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30 Church St., New York 7, N. Y.
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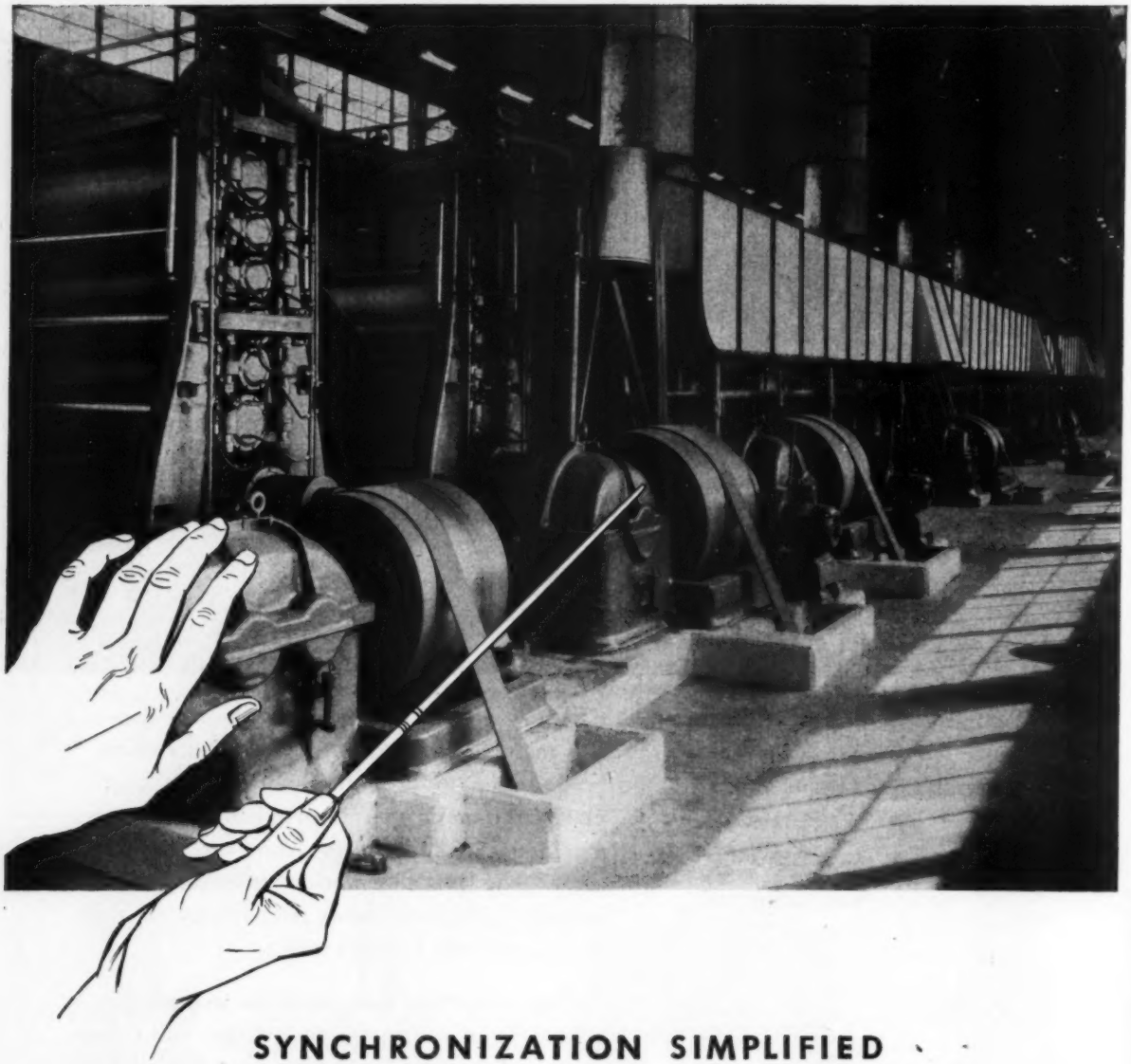
47-49 Laplante Ave., Toronto 2

YES! GO WEST!

1949 Fall Meeting TAPPI

Portland, Oregon



SYNCHRONIZATION SIMPLIFIED

MILLS with Black-Clawson spiral bevel gear drives on their paper machines find it a simple matter to regulate the speed of various machine sections. As a result, fewer breaks in the sheet occur and little production time is lost.

B-C spiral bevel gear drives are extra-rugged in design, precision-built, nicely balanced and are noticeably free from vibration.

The line is a complete one—spiral bevel gear, hypoid, extended shaft, calender reversing and dryer inching. Air-flex clutch remote control attachment for operation from front side of the machine optional.

Black-Clawson Co.

HAMILTON, OHIO

Divisions: SHARTLE BROS. MACHINE CO., MIDDLETOWN, OHIO

DILTS MACHINE WORKS, *The Kohler System*, Fulton, N. Y. Also Chicago Office for The Kohler System line at 159 E. Chicago Ave.

Western Sales Office: Mayer Bldg., Portland, Ore. Associate: ALEXANDER FLECK LIMITED, Ottawa, Canada

Subsidiary: B-C INTERNATIONAL, LTD., 16 Catherine Place, Victoria, London S.W.1, England

THE PAPER INDUSTRY
and PAPER WORLD
JUNE 1949

Editorial

Higher Taxes—Lower Production

▸▸▸ SAYS THE Department of Commerce of the business situation in its May issue of *Current Business,* "production and prices continued their gradual reductions to the reduced level of total demand, as the second quarter opened." We find corroboration of that fact in the drop of the Federal Reserve Bank's Index number of business activity. The April figure was 179, a decline of five points from the March figure of 184. That makes the second drop of five points in the two successive months, which, to our minds, is a bit more than a "gradual decline," quoted by the Department of Commerce.

A preliminary check of May business reveals further "gradual" decline in "production and prices" with the June outlook as poor.

What is causing this continuance of declining "production and prices"? It's a fair question and vital to the national economy.

Our answer is that business psychology immediately after the election of last November, became hesitant and halting. Now, it has turned definitely sour. When the President came out in January with his demand for a four-billion dollar increase of income taxes and fifteen hundred million dollars increase in individual and payroll taxes to finance expanded social security and prepaid federal health insurance programs, claiming he had a mandate from the people for all such spending, the consumers and tax payers turned thumbs down on the program and challenged the alleged mandate.

The people knew that the inflation was coming to an end, and that the postwar boom in spending had ended. They immediately began to curtail their spendings and lodged protests with the Congress to cease governmental spending. So, to date, the tax paying consumers of the nation have continued in their program of cautious investment and restricted buying while the President and the Congress are still sparring over the question of increased governmental expenditures.

The issue is governmental economy. For there is not a citizen of this country from the humblest worker to the highest income tycoon who is not feeling the pinch of economic necessity on his pocket book, caused by the shameful, indefensible tax gougings already imposed, and now looking at the proposed increases of some six billion dollars in additional taxes.

The taxpayers remember that on March 20 last, Senator George, Chairman of the Senate Finance Committee, said that "the one thing we ought to do now is to reduce taxes, not raise them" and he also added this most significant warning: "only one thing will cause a sizable depression this year in the United States—that is the addition of four to six billion dollars in new taxes as proposed by President Truman."

The issue, we repeat, is economy in Government expense.

The lines are being drawn right now between the taxpayers and the tax-eaters. In the meantime, the business economy of the nation is trending downward at an accelerated rate every month as the Department of Commerce and Federal Reserve Bank Index record.

In addition, the business economy of the country is beginning to show signs of extreme impatience to the defiance in Washington of simple law of primary economics—that is, of increasing expense in the face of declining income. Those warning signs are found in the heavy breaks in commodity prices, in wheat, and other grains, and equities on the stock markets, both here and abroad. These indices cannot be too long ignored. For "millions and millions of our citizens, sensing something wrong, have not missed the import of the actions at Washington. They have been doing the only thing available to them when the Government shows signs of refusing to protect its credit—they have been refusing to buy goods."

Perhaps, it is necessary that the Truman election recession goes farther and the losses go deeper in order to shock the administration and the Congress into doing an about-face and taking speedy action to lift the burden of confiscatory taxation from the backs of the tax-paying public.

Until Washington awakens to the true state of the nation today, abandons its fatuous financial follies, and passes some sane economic legislation, based upon the changing national economic needs, there will be a further continuance of "the reduction of production and prices."

Economic prostitution never paid a righteous dividend.

A WEST COAST TREE FARM
A UNIT OF THE WASHINGTON FOREST PRODUCTS COOPERATIVE ASSOCIATION
UNIT OWNER
AMERICAN TREE FARM SYSTEM

Keep It Green by Growing "More Trees"

▸▸▸ CITIZENS OF the State of Washington are organized to prevent any repetition of forest holocausts like that which occurred in the state in 1902 causing millions of dollars worth of damage.

In eight years this public spirited group operating under the banner "Keep Washington Green" has worked wonders in helping to reduce the number of forest fires, acreage burned, and resulting dollar loss to the state.

Gov. Arthur B. Langlie of Washington in his recent speech before the annual meeting of the Keep Green group pointed out that in 1941 a total of 1,446 man-caused forest fires burned 46,600 acres. Last year, he said, less than 500 fires, including those caused by lightning, burned a little more than 6,000 acres.

He gave credit to all the forest protection forces in the state working to prevent and suppress timber fires, but particularly stressed the splendid work the state and local organizations of Keep Washington Green has been doing in educating the public on forest fire prevention.

The Keep Green program idea was launched in 1941 in Washington to enlist citizens' support in reducing the state's forest fire damage. Since, it has spread to 25 other states under banners of Keep Florida Green, Keep Maine Green, etc. The program is sponsored nationally by American Forest Products Industries, an organization supported by the lumber, pulp and paper, and plywood industries.

Gov. Langlie stated that the average forest area burned in the period 1917-1939 amounted to 158,493 acres. Since 1940, following the launching of the Keep Green program, the average area burned has been about 30,000 acres.

"Trees grow. Trees burn. The question is how to impress on the forest-using public the simple fact that our wealth-producing trees may be easily destroyed by the flip of a live cigarette, a carelessly tossed match, or a neglected campfire. People can be impressed with the danger and the potential disaster only through unending educational effort. This is your task. I repeat that you have done wonderfully well with it, but there is more, much more work to do," Langlie told the Keep Green group.

He said that in 1941 he had urged a three-part program for the Keep Green movement: First, public information; Second, stronger enforcement of the forest protection laws; Third, forestry education in the public schools.

The Keep Washington Green message has been increasingly carried to the public through all media. Forestry with other conservation studies, is finding a place in school curriculums. And as to law enforcement, Gov. Langlie said he wanted to underscore and repeat at this meeting a statement he made in 1941:

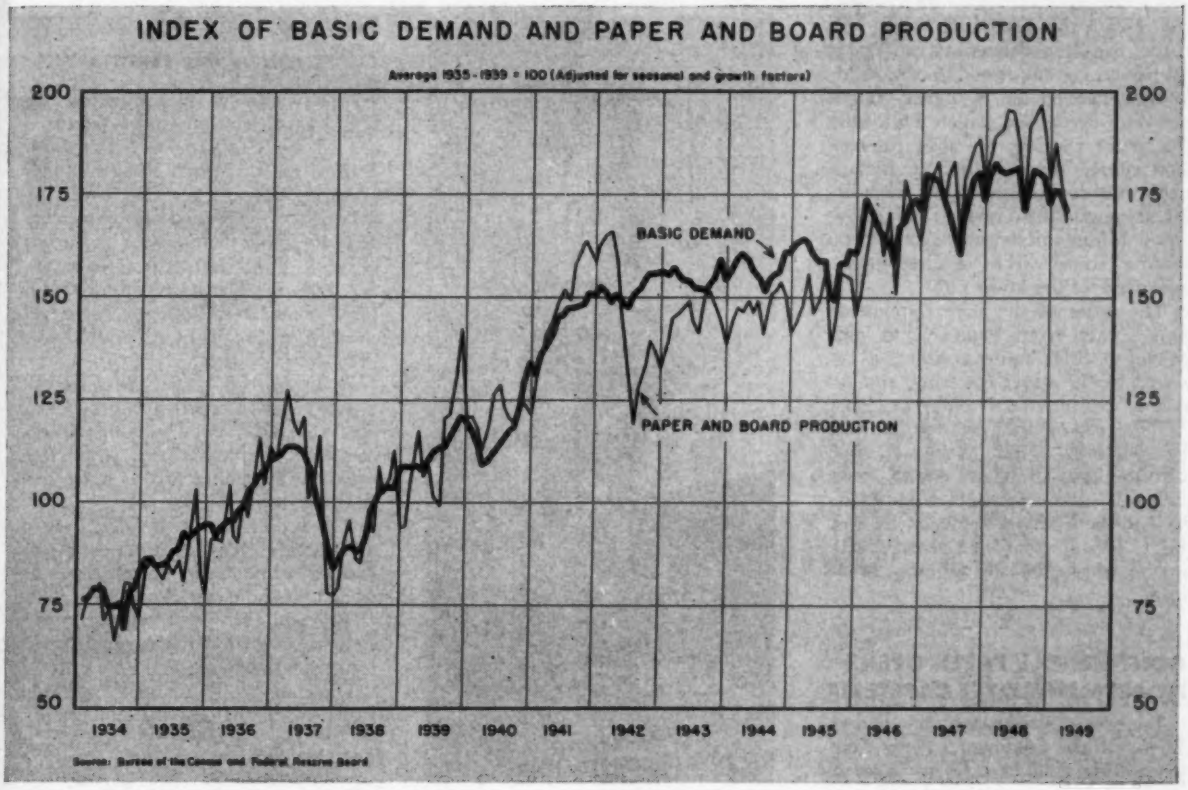
"The State Patrol will . . . enforce the law that prohibits, during the closed season, the throwing of live cigarettes or other lighted material in forest brush, range or grain areas of this state. April 15 opened this season."

The work of Keep Washington Green is one task among a number of projects of vital importance which is being integrated through natural processes of growth to assure our states a forest future greater than our forest past. Through the war and postwar years industrial forestry has had amazing growth, along with the values of second-growth forest areas. No other state can match the annual dollar value of our forest products or the amount of our annual forest payrolls.

Private investment keeps faith in the future of the state's 683 sawmills, 22 pulp mills, 31 plywood plants, 125 shingle mills, hundreds of logging operations, hundreds of other wood-using plants. Forest research programs flourish. So does farm forestry. So do our forestry schools. In all this Keep Washington Green has one simple purpose—the prevention of forest fires. Hold to it for your part in continued forest progress, Gov. Langlie said.

Supplementing its Keep Washington Green campaign, the Evergreen State also has a program termed "More

(Turn to page 320)



Reproduced from "An Index of the Basic Demand for Paper," second edition, by Dr. Louis T. Stevenson, economist, American Paper and Pulp Association

Feast and Famine or Stability?

▶▶▶ PRODUCTION FIGURES released by the American Paper and Pulp Association show an estimated April production of paper and board (1949) at 1,600,000 tons as compared with 1,900,000 tons in April of 1948. This is a drop of 15.8 per cent compared with an 8 per cent drop from the first quarter of 1948 to this year's initial quarter. The readjustment of inventories in the hands of converters, paper merchants and consumers has continued during April and into May, as evidenced by the behavior of our Weekly Production Report. With the breaking of the upward spiral of commodity prices during the year 1948, the incentive to advance buying on a rising market has disappeared from pretty much all industry. General curtailment of advance buying in the over-all economy has slightly curtailed the indicated actual consumption of paper, although, through March indicated actual consumption was running over 70 per cent above the prewar level. The 3 per cent drop in indicated actual consumption accounts for but a small part of the curtailment of production. The conclusion is that the balance of production curtailment is due to withholding of orders incident to reductions in inventories. When these reductions have been completed, it is but reasonable to expect that production will more closely approximate indicated consumption.

The current drop in production ratios has again brought into circulation in some quarters the "feast and famine" characterization of the paper industry. It is true that pulp and paper mills, because of their high capital requirements and consequent low ratio of sales to net worth, have a high break-even point. But it is equally true that this industry's level of production is much steadier than that of many other industries.

The nature of the product and its uses are such that a continuing supply is necessary to the maintenance of many essential services. Consequently, even in the depths of the severe 1932 depression production was 58 per cent of capacity as compared with a drop to 20 per cent in the iron and steel industry. That year was the lowest on record in the paper industry and nothing approaching it is in sight.

In March, the index of over-all production was definitely below the index of basic demand for the first time since early 1947. The latter dropped slightly but production dropped about eight points. Indications are that April will show a further adjustment of the same kind. Actual consumption (as shown by the Basic Demand Index) was running ahead of production, indicating that over-all inventories in the hands of converters, merchants, and consumers were being drawn down.

▼

NEWSPRINT FREIGHT RATE NOW APPLIES TO DEINKED PAPER STOCK IN MICH.

Railroad freight rates in Michigan have been lowered as the result of a complaint filed against four railways by the Michigan Paper Company of Plainwell, Michigan. The reduction, granted by the state public service commission, averages approximately 12 per cent, and applies to newsprint manufactured from deinked paper.

Michigan Paper has been making newsprint by the deinking conversion method, avoiding the use of pulpwood, but they ran up against a freight bar-

rier. Newsprint, according to the railroads, has been defined as containing 60 per cent groundwood. Consequently, this necessitated a higher freight rate for reprocessed paper. Following the recent hearing, the state commission altered the definition to include newsprint containing 60 per cent deinked newspapers, books, and magazines. Minimum shipments of 40,000 lb. in a carload will be required to take advantage of the lower rate.

The order of the state commission found rates from Plainwell to nine Michigan cities "unreasonable," as asserted by the paper company, and ordered a change effective May 25, 1949.

Involved in the decision are the Pennsylvania, New York Central, Chesapeake & Ohio, and Grand Trunk railroads, and shipments from Plainwell to Ann Arbor, Bay City, Detroit, Flint, Grand Rapids, Jackson, Kalamazoo, Muskegon, and Saginaw, Michigan.

▼

CONTINENTAL PAPER OPENS MODERN EMPLOYEE CAFETERIA

Increase in employee morale and efficiency at the Continental Paper Company, Ridgefield Park, New Jersey, is expected as the result of the opening of a new employee cafeteria. In design and equipment it is the last word in modern industrial cafeterias. It was built at a cost of approximately $40,000.

The cafeteria is equipped with an electrically heated, thermostatically controlled hot food counter, electric ranges, automatic dishwasher, and refrigerators. Kitchen and counter equipment are stainless steel throughout. Air conditioning adds to the clean, comfortable atmosphere. More than 100 persons may be seated in the cafeteria. The furnishings are modern and colorful, and it is equipped with recessed lights. There are large windows which give a view of the countryside.

▼

MANDO ANNOUNCES AWARDS FOR 1949 SCHOLARSHIPS

Winners of the 1949 Minnesota and Ontario Paper Company scholarships are two 17-year-old International Falls, Minnesota, high school seniors, Raymond Lynch and Daniel McCarthy.

Chosen by a faculty committee for their outstanding scholastic records and creditable extra-curricular activities, the two youths will be eligible to receive $2,000 each for a college education over a four-year period from the Minneapolis concern. This Mando scholarship fund is payable at the rate of $500 a year. To remain eligible for these annual payments, students must maintain high grades. The scholarships may be applied to approved courses of study at any accredited college or university in the United States. The approved courses are forestry, engineering, chemistry, and business administration. These courses are designated because in the opinion of the company they cover fields of service having the most value to the community and the Mando industries.

These latest awards bring to five the number of Mando scholarships provided for International Falls students since the awards were established in 1947. In addition, Mando each year sponsors two similar $2,000 Canadian scholarships for graduates of Fort Frances and Kenora, Ontario, high schools. Benefits must be applied to approved courses of study at the University of Toronto. Winners of these scholarships will be announced in the next few months.

Dixie Queen

This charming young Georgian now reigns over the piney woods of Dixie as Miss Spirits of Gum Turpentine. She is Miss Pat Atkins, of Albany, Georgia, who was selected at the recent annual meeting of the American Turpentine Farmers Association at Valdosta, Georgia.

Miss Atkins won out over eight other young ladies who represented the Association's directorship; she was sponsored in the beauty contest by Judge Harley Langdal, president of the Association. The girls were dressed in traditional pine needles costumes

Keep It Green . . .

(Continued from page 318)

Trees" which is sponsored by the Washington State Forestry Conference, headed by Gordon D. Marckworth, dean of the University of Washington College of Forestry. This project is designed to sell good forest management to private landowners, particularly farmers. Similar plans are now under way in Alabama, Virginia, and New Hampshire, all of them encouraged nationally by American Forest Products Industries.

According to Dean Marckworth, timber growth and cash income of nearly all farm woodlands in the state could be doubled if tree crops were managed as intelligently as other agricultural crops.

The program will be carried out in all the state's forested counties by local forestry committees. Information designed to show woodland owners the "hows and whys" of profitable tree growing is being distributed to every timberland owner.

Director of Washington's "More Trees" program is Knut Lunnum, extension forester at the State College of Washington in Pullman. State, federal, and industrial foresters will work closely with county "More Trees" committees in co-operating closely with county agents, soil conservation district supervisors, and members of the various county forestry committees.

▼

AMERICAN BOXBOARD CO. WHSE. DAMAGED BY FIRE

Fire recently swept through a paper-filled warehouse leased by the American Boxboard Company in Grand Rapids, Michigan, causing an estimated damage of $25,000. Spontaneous combustion is said to be responsible for the blaze.

Boxboard company officials estimated damage to paper stock will not exceed $5,000 and the local fire chief estimated the building loss at $20,000.

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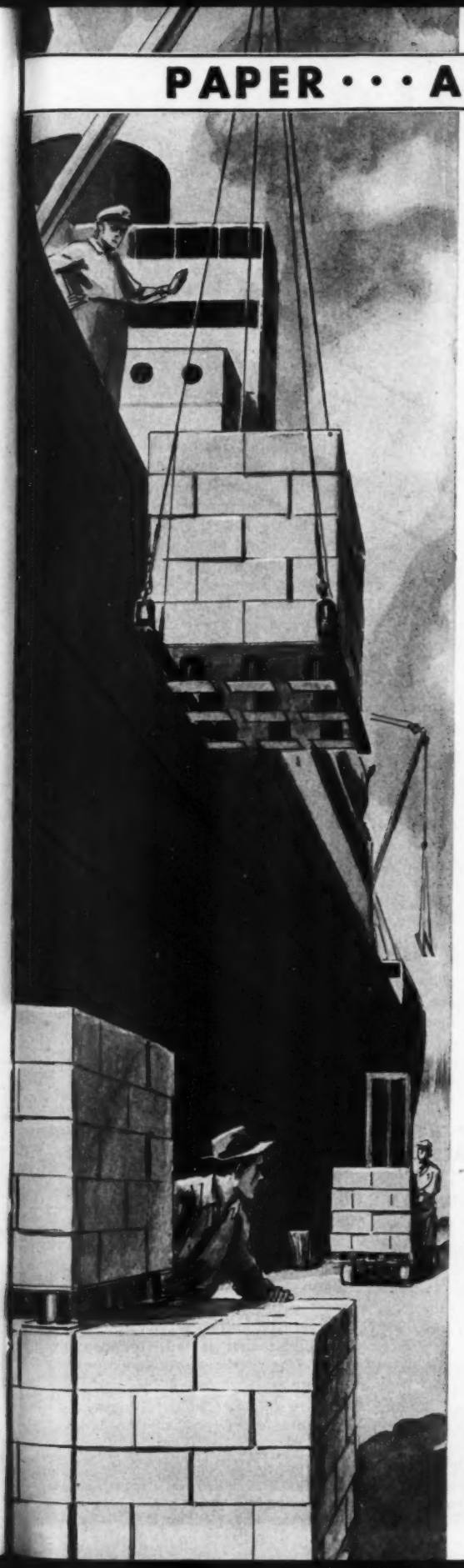
▶▶▶ COMPLETION OF the major units of an improvement and expansion program at a cost in excess of $11,000,000 at its Camas, Washington, division has been announced by the Crown Zellerbach Corporation. The company has more than doubled its kraft mill there, erected a new kraft bleach plant, and a new kraft screen room, added facial tissue machines, and another paper machine, installed another supercalender in the No. 1 finishing room, made additions to the steam plant, and added new finish and storage space.

PAPER · · · America's 6th Industry



PAPER PALLETS CUT SHIPPING COSTS

(NEWS ITEM: *Disposable 8-lb. paper pallets are replacing 60-lb. wooden skids for economical shipment of large unit loads.*)

A new method of reducing freight costs is the use of water-resistant paper pallets that can be discarded at the end of a trip. Made of a corrugated paperboard platform supported by spiral chipboard tubes, these paper pallets can carry static loads of 18,000 pounds in transit by plane, truck, rail or ship. We will gladly supply manufacturer's name on request.

Paper sacks for open storage . . . paper bags to package ice . . . paper for polishing silver . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance.

To meet these new responsibilities and new opportunities developed by the Pulp and Paper Industry, the Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

Additional capacity in Metals Fabrication is now available through conversion of facilities formerly devoted to the building of ships.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
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YES
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1949 Fall Meeting
TAPPI, Portland, Ore.

Forestry College Sets Up New Post . . .
Dr. E. C. Jahn Is Research Director

▶▶▶ A NEWLY CREATED position, director of research, has been established by the New York State College of Forestry, Syracuse, New York, as a result of rapid growth in research at the college during recent years. Currently budgeted at $225,000, the research program had its first specific state appropriation, for $25,000, in 1946.

Dr. Edwin C. Jahn, professor of forest chemistry at the college and an international authority on cellulose, was appointed to the new position effective June 1, Dean Joseph S. Illick announced. Dr. Jahn will define the state forestry college's research objectives and the program for reaching them, and will act as liaison with other public and private research agencies and with forest operators and forest industries.

"Research is one of our major responsibilities specified in the college's state charter in 1911, and today includes important projects in all major fields of modern forestry," Dean Illick said. Fiscal 1949-1950 appropriations from the state for forestry research total $133,000, to which are added funds from other sources to make $225,000 — almost half the college's entire prewar budget.

Choice of Dr. Jahn from the College of Forestry's own faculty followed a wide search for the man best qualified for the new, high-level position, Dr. Illick revealed.

Laboratory and field investigations now under way at the college include successful methods of pulping hardwoods, natural-fiber and synthetic plastics, improved manufacture of plywood by electronic heating, decay resistance and prevention in wood, regeneration of abandoned land through forest management, prevalence and control of wood-destroying insects in New York, and wildlife pathology and propagation. Facilities both at the college, on the Syracuse University campus, and at its seven forest properties are used for research.

Dr. Jahn was graduated from the College of Forestry in 1925. He has been professor of forest chemistry there since 1938, teaching organic, cellulose, and advanced wood chemistry and plastics and cellulose technology. He will continue to teach one or two courses. He earned the M. S. degree at the College of Forestry in 1926, and the Ph. D. degree at McGill University, Montreal, in 1929.

His research, results of which have been reported in 65 technical and scientific articles, has in recent years been given largely to studies of woody tissue and its use. During the war, Dr. Jahn was on leave from the college as special technical adviser with the State Department, serving at the American legation in Stockholm as consultant on scientific and technical developments in Sweden, Finland, and northern Europe.

Dr. Edwin C. Jahn

During 1945-1946, he made a postwar economic survey of the Scandinavian pulp and paper industry for the U. S. Government, while senior economic analyst of the Department of Commerce and attache to the U. S. legations and embassies at Stockholm, Oslo, Helsinke, and Copenhagen.

Chairman of the Plastics Committee of the Technical Association of the Pulp and Paper Industry, Dr. Jahn is also a member of the Society of American Foresters, American Chemical Society, and Sigma Xi research fraternity. Prior to joining the faculty of the College of Forestry he was professor of forestry at the University of Idaho from 1930 to 1938, there developing a four-year curriculum in wood utilization technology.

▼

UNION BAG OPENS FOREST NURSERY—SEEDLINGS TO PRIVATE LAND OWNERS

As part of its program of growing more trees for tomorrow, Union Bag & Paper Corporation has opened a forest nursery at the site of its Sapelo Forest, 45 miles south of Savannah, Georgia, which this year will produce 1,000,000 pine seedlings for planting on company land and for distribution to other private land owners.

During the 13 years Union Bag & Paper Corporation has operated its plant at Savannah, the company has planted on its lands and distributed to the other land owners approximately 12,000,000 seedlings.

J. J. Armstrong, general manager of the Woodlands Division of the company, stated that the opening of the Sapelo nursery would not change Union Bag's practice of purchasing additional pine seedlings from the state nurseries for planting on company tracts and for free distribution to youth organizations in the state.

T. B. Dalby, forest supervisor in charge of the nursery, states the young trees have gotten off to a wonderful start and that he obtained practically a 100 per cent seed germination.

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▶▶▶ AN EXPANSION PROJECT, which added more than 44,000 sq ft and more than doubled production space for the manufacture of corrugated paper containers, has been completed by the Robert Gair Company at its Fort Niagara plant. Increased office facilities have also been provided, and enclosed trucking bays, a train shed and loading platform have also been added, giving improved facilities for the handling of raw material and finished containers.

▼

NEW HEAVY-DUTY ROAD WILL SPEED MOVEMENT OF LOGS TO WEYERHAEUSER

Thirteen miles of new logging road into a large timber tract in eastern Cowlitz County, Washington, is being built by the Weyerhaeuser Timber Company, of Longview, Washington. There will be a two-lane, heavy-duty arterial road, engineered for heavy trucks. It will connect with the present railroad which runs to the Longview mills.

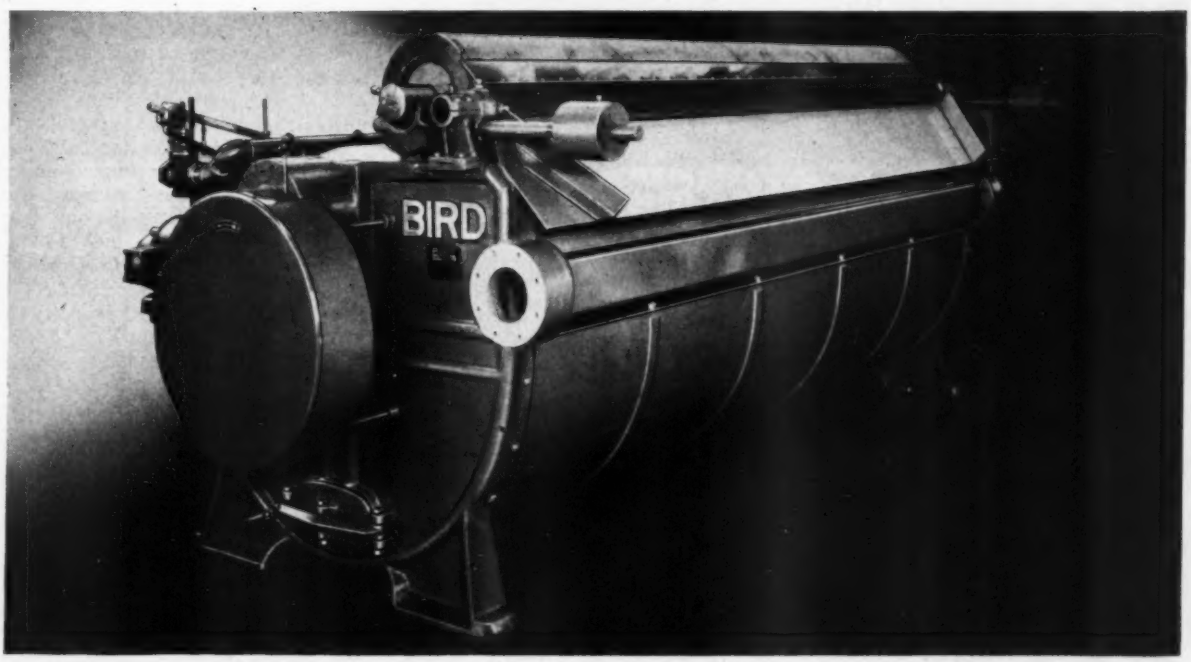
The first logging of mature trees is planned for 1950, with the logs to be moved by truck and train to the Longview pulp plants, sawmills and plywood plant.

Several thousand acres of the tract are covered with 40 year old second growth in an area which has been reforested since the Yacolt burn of 1909. This young crop will reach merchantable size before the old growth timber has been cut.

▼

▶▶▶ FOR THE IMPROVEMENT of its plant in North Charleston, The West Virginia Pulp and Paper Company of Charleston, West Virginia, has announced that it will spend more than $4,500,000. The improvements are expected to relieve the strain on existing facilities in the chemical recovery cycle, the power plant and the pulp mill, and to provide excess capacity for expansion in the future.

THIS BIRD SAVE-ALL PAID FOR ITSELF *in 19 weeks*



Its user, a maker of specialty papers, carefully figured the gain in yield after installing the Bird Save-All, translated it into dollars, and figured it owed him nothing after a little over four months of operation.

Immediate and substantial return on your investment in a Bird Save-All system of fibre recovery is virtually certain and is readily calculable in advance. In addition it puts the water in shape for re-use and makes it easy and economical to treat any excess water before final disposal.

If your paper machine still poses a white water problem, let us make recommendations and estimates on the Bird Save-All system that will produce the highest net return for you.

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

Murdock Leaves General MacArthur's Staff to Head New Paper and Chemical Service

▶▶▶ THE UTILIZATION of industrial waste from industry is more and more demanding the skill and application of the profession of chemical engineering. For the purpose of dealing with this phase of the industry, a Paper and Chemical Department has been established by Robert and Company Associates, of Atlanta, Georgia. This new department, together with the concern's other engineering departments, will provide a complete consultation and engineering service for the wood pulp, paper, and chemical industries.

Coupled with this expanding service comes the announcement that Harold R. Murdock, head of the Pulp and Paper Industry, Forestry Division, SCAP, has resigned from General MacArthur's staff in Japan, and will be in direct charge of this new activity.

Mr. Murdock has been active in the paper and chemical fields for over thirty-six years. The past twenty-one years have been essentially with the pulp and paper industry, while the earlier years were with many chemical companies engaged in the production of heavy chemicals, organic chemicals, dyestuffs, pharmaceuticals, rubber products, the reclamation of rubber, the production of pencils and other wood-consuming products.

He was director of research of the wood pulp divisions of Champion Paper and Fibre Company at Canton, North Carolina, and Houston, Texas. He was also vice president of a Champion subsidiary, Hamilton Laboratories, Incorporated, and the originator of Merfenelopes, the first convenient method for applying organic mercurial chemicals in destroying slime forming organisms in paper making systems. This product of Hamilton Laboratories has had wide application in the paper mills of many countries.

In 1944, Mr. Murdock established a private consultation practice. He was retained by a number of pulp and paper companies on processing problems. As a columnist in *Industrial and Engineering Chemistry* (a publication of the American Chemical Society) he wrote on the problems of Waste Utilization and established himself as an authority on that subject.

During the past three years Mr. Murdock served on General MacArthur's Staff in Japan as head of the Pulp and Paper Industry, Forestry Division, Natural Resources Section. He organized the Japan Technical Association of the Pulp and Paper Industry. The industry had never before had a technical organization. The formation of Japan Pulp and Paper Association, Japanese Hand Made Paper Association and Japan Pulpwood Association were also due to Mr. Murdock's instigation. Reconstruction of paper grades and prices, and consolidation of various producing factions into a unified group in Japan were also substantially due to Mr. Murdock's direction.

Harold R. Murdock

The Japanese pulp and paper industry established in 1947 a Murdock Medal of Award to be given annually to those who contribute substantially to the welfare of the industry. This first medal was given to Mr. Murdock on March 17, 1948, and subsequently three other Murdock Medals have been presented to the Japanese.

▼

▶▶▶ A CONSOLIDATION by the Walloomsac Paper Mills, Inc., of all of its departments formerly in the Grand Central Terminal Building, 25 Vanderbilt Avenue, New York City, at the mill in Walloomsac, New York, became effective May 23. Mailing address is P. O. North Hoosick, New York. Telephone, Hoosick Falls 90-1-2-3.

▼

PULP MILL ON WATSON I. PROGRESSING—EQUIPMENT ORDERS HAVE BEEN PLACED

Construction work on the high alpha-cellulose pulp plant on Watson Island, being built by the Columbia Cellulose Company, Ltd., Prince Rupert, British Columbia, Canada, has been increased to two daily shifts of eight hours each. Engineering work is well advanced, and orders for long-dated equipment have been placed. Warehouse facilities for construction materials have been provided, and a camp housing several hundred construction workers has been erected and is now in operation.

The pulp mill is being built to produce 200 tons per day of high alpha pulp by the sulphite process. Watson Island, which is eight miles from Prince Rupert, is the site of a large arc shaped concrete-decked dock which was built for and used by the United States Army during the war, and which provides excellent facilities for shipment by both rail and water.

▼

POTSDAM PAPER MILLS WILL REVERT TO FORMER OWNER

The property of the Potsdam Paper Mills, Potsdam, New York, will be returned to the Reading Corrugated Container Corporation, Potsdam, according to reports from Utica. At a meeting May 2, the Potsdam Paper Mills, Inc., was ordered to file a petition in bankruptcy. The mills automatically return to the Reading Company, which leased the property under a clause that in case of bankruptcy the property would revert to the owner.

The present owners, the Reading Corrugated Container Corporation, purchased the property from Max Sverdlow, and in October, 1947, leased it to the Potsdam Paper Mills, Inc., after they had ceased papermaking operations.

The Potsdam Paper Mills filed a reorganization petition in bankruptcy in Utica February 7, listing liabilities of $163,753 and assets of $7,708 and some machinery. The mill had been operating under a creditor's committee for some time.

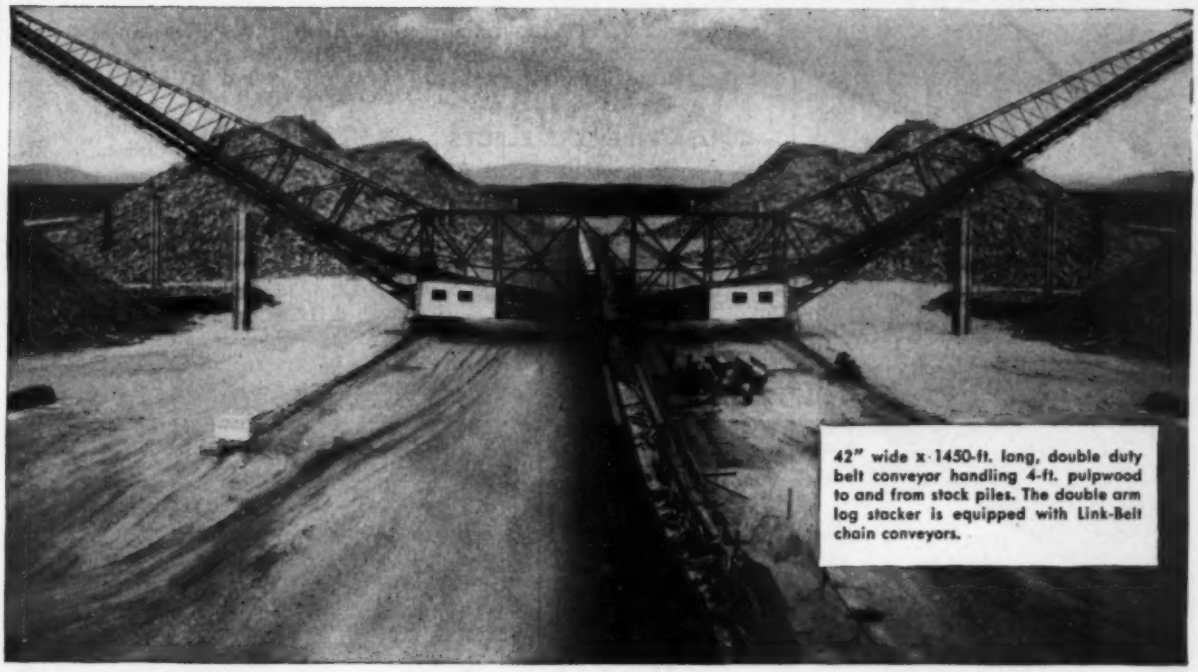
▼

GAIR ANNOUNCES PURCHASE OF FIBRE BOARD CONTAINER

The Fibre Board Container Company, which has maintained plants in Richmond and Martinsville, Virginia, has been sold to the Robert Gair Company, Inc.

While no announcement was made as to the money involved, the price was said to have been around $3,000,000, including cash and stock transfers. The name of the Virginia firm will be retained in a new corporate setup whereby the present partners, L. N. Donati, A. J. Bagley, and T. J. Bourne, Jr., will be made members of the board of directors. No change of personnel is contemplated.

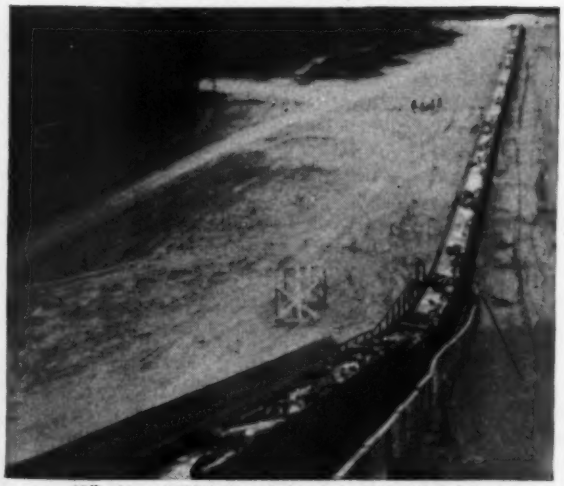
Fibre Board was organized 34 years ago by L. N. Donati and his brother, David Donati. The latter passed on in 1941 and Bagley and Bourne purchased a half interest in the corporation. The company manufactures all types of fibre containers from cigarette cartons to



42" wide x 1450-ft. long, double duty belt conveyor handling 4-ft. pulpwood to and from stock piles. The double arm log stacker is equipped with Link-Belt chain conveyors.

AT LongLac . . . Pulpwood is moved *Efficiently with* LINK-BELT CONVEYORS & DRIVES

Log haulup and slasher equipped with 8 strands of TL-132 chain with spur attachments.



42" wide x 1600-ft. long belt conveyor handling 4-ft. pulpwood from slasher to wood room or storage.

Production requirements are met easily and economically with the installation of Link-Belt equipment at LongLac Pulp & Paper Co. Ltd., Terrace Bay, Ont.

For the mechanical handling of pulpwood from pond to slasher—to barkers and chippers—or to storage, the handling of wood chips, bulk chemicals, coal and the screening of intake water, Link-Belt equipment assures the benefit of the outstanding experience and facilities of the leading manufacturer of conveying and power transmission machinery.

Considerable Link-Belt power transmission machinery is used for driving conveyors and other types of equipment throughout the plant.

Link-Belt engineering advice and facilities are at your service. Address the nearest office.

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LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 3, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

YES! GO WEST! 1949 FALL MEETING TAPPI—SEPT. 12-16—PORTLAND, OREGON

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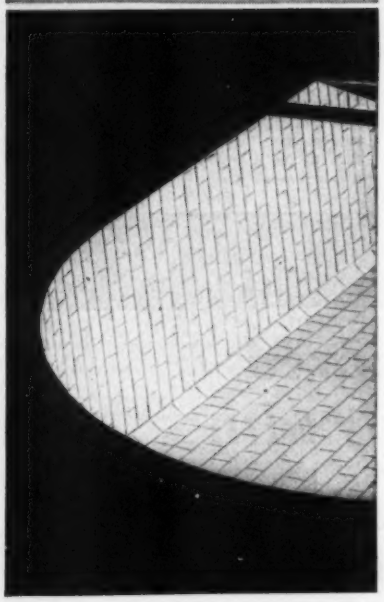
Acid and
ALKALI-PROOF
CEMENT



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- Durisite is non-toxic — has no dangerous effect on the skin
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furniture cartons. The Richmond plant employs approximately 125 persons and the Martinsville plant about 80.

▼

COOSA RIVER CO. ELECTS

At a meeting of the Coosa River Newsprint Company, held at Coosa Pines, Alabama, the following officers were elected. The company, which is building a new plant at Coosa Pines, announced the slate of officers on May 20:

Chairman of the Board—Donald Comer

President—Edward L. Norton

Executive Vice President and General Manager—A. G. Wakeman

Vice President in Charge of Sales—Ralph M. Watt

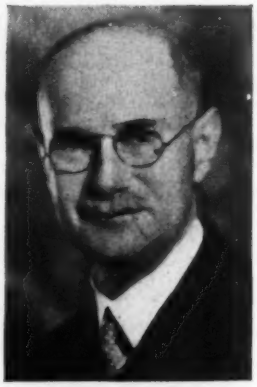
Secretary—Walter Bouldin

Treasurer—W. H. Clifford

Asst. Secretary-Treasurer — P. A. Bachelder

In addition to Messrs. Comer, Norton, Watt and Wakeman, the board of directors is composed of the following: Stewart M. Chambers, E. K. Gaylord, C. B. Hanson, Jr., John R. Kimberly, Ernst Mahler, Thomas W. Martin, Cola G. Parker, Roy A. Roberts, John F. Tims, Jr.

Closing Lecture at U. of Maine Series given by *Dr. Edwin Sutermeister*



Dr. Edwin Sutermeister

▶▶▶ A SERIES OF lectures on paper technology has been conducted at the University of Maine during the past season, with approximately 32 lectures by prominent authorities having been given from September through May.

The last lecture of the series was given on May 17 by Dr. Edwin Sutermeister, research chemist for the past 50 years at the S. D. Warren Company, Cumberland Mills, Maine.

Speaking before the meeting of students, staff members, and guests, Dr. Sutermeister gave a general history of paper testing from ancient times to the present.

He pointed out that in the period from 1890-1899 specifications were listed by German scientists regarding the general classes of papers. He outlined changes which have been made in the general specifications of papers from that time, noting the German classification of normal celluloses through the emphasis placed by the Bureau of Standards on the alpha-cellulose content and copper number of fibers in the paper, and later to the effect of acidity and alkalinity.

"Even with these steps in grading papers there is no possibility, as yet, of rating a paper as to its length of useful life," he said.

In confirmation of this, several Chinese papers 300-900 years old were mentioned which are in excellent physical condition yet do not conform to any of the accepted classifications.

With regard to the writing of specifications, he emphasized that all concerned in the manufacture, sale, and use of papers should get together in order to have the specifications workable and acceptable to all. As examples of this, several specifications which did not bring out the required properties in the paper were mentioned.

A list of paper tests which would be desirable to work into specifications was given. These tests are such that they can be applied in individual mills, but there are no standard methods generally available and, in some cases, no apparatus which is presently obtainable.

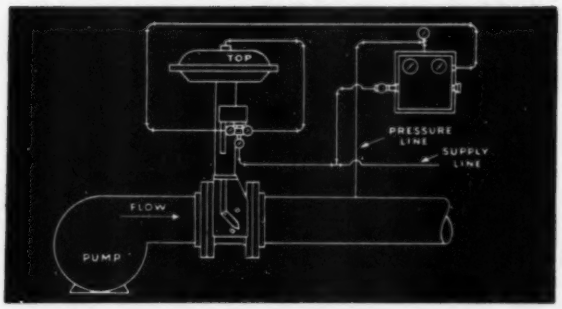
Dr. Sutermeister was awarded an honorary doctor of science degree at the University of Maine during the 1948 commencement.

This series on paper technology was arranged by Prof. Lyle Jenness, head of the department of chemical engineering, and conducted by John Lewis, instructor.

R-S valvEvents

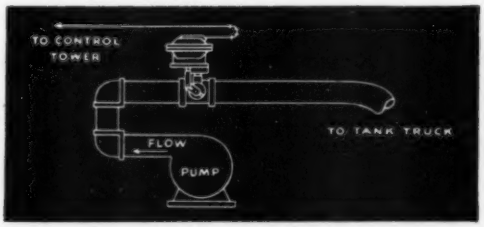
• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •

POWER OPERATED CONTROL OF DOWNSTREAM PRESSURE



A common application of R-S Valves is the power operated control and shut-off of downstream pressure or temperature. In the above diagrammatic drawing, the pressure or temperature controller (upper right) is actuated by the downstream pressure or temperature, and controls in turn the positioner and diaphragm top of the valve. Any liquid, gas or semi-solid can be controlled in this manner.

Accurate Measurement of Volume

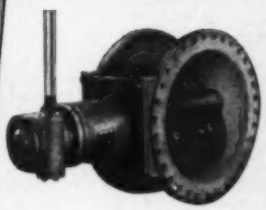


The accurate measurement of oil, gasoline, chemicals, etc. pumped from storage tank to tank truck or other container is a simple matter when arranged as illustrated. The pump is started and the R-S Valve opened at the same time from the control tower. A flow meter automatically shuts off the pump and valve when a predetermined number of gallons has been reached.

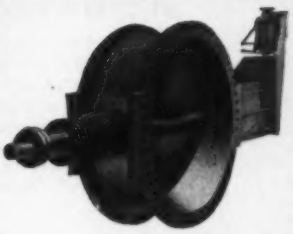
The angular discs of R-S Valves seat at an angle of 12½° to provide wedge-type metal to metal closure. These valves are rubber lined, rubber spool or rubber disc seated to provide positive 100% shut off.

For simplified control and shut off of volume and pressure, consult with your local R-S representative. You will find the address and phone number listed under "R-S Products Corporation, Valves."

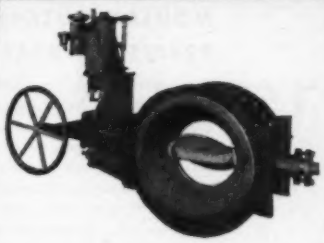
R-S Products Corporation, Wayne Junction, Philadelphia 44, Pa.



No. 732. 30-inch 50-pound Heavy Service Valve. Equipped with rubber spool, gear reduction drive and extended shaft. Limitorque Motor mounted above valve.



No. 735. 72-inch 125-pound "H" Metal Valve for elevated temperatures. Equipped with cooling fins, oil cylinder and positioner utilizing 200 psig oil and 0-15 psig instrument air.



No. 742. 30-inch 150-pound Class B Steel Valve with air cylinder, cam driven positioner, hand wheel and declutching mechanism. Handles highly abrasive catalyst. Downstream cone replaceable.

No. 718. 18-inch straight Through Slide Valve. 150-pound American Standard raised face flanges. Air cylinder operated. Rising stem handwheel operator with declutching unit. Suitable for handling liquids, gases and semi-solids including catalysts.

The Midwest Line

A LONG-ESTABLISHED LINE

HI-SPEED PULPERS

Will *completely slush* up to 60 tons of virgin pulp or broke per day, depending on size of unit, and do it on input load of only 60 H.P. Will out-perform any other pulping agent on basis of complete make-down —no small pieces, no shiners, no fish eyes. Thoroughness of its work will lighten load on beaters and prolong their life. In some mills have actually replaced beaters. Reasonably priced. Fairly prompt deliveries.

HOLLANDER BEATERS

Over the past 25 years hundreds of Midwest hi-speed Hollanders have been built and mills still interested in standard beaters, or obliged to replace or repair existing equipment, may count on prompt service.

MODERN AUTOMATIC PRECISION BEATERS

Very fast. Will replace four or five standard beaters and do their work far better. Controls can be set to duplicate exactly any previous furnish. Because input load works largely on the stock rather than just to circulate it, the savings in power are alone sufficient to amortize entire investment reasonably soon. In light of work done, way it is done, and economies effected, very reasonably priced.

FULTON DRYER DRAINAGE SYSTEMS

In neighborhood of 75% of all paper machines now have Fulton drainage equipment on their dryer sections. Here's why. Drying capacity increased up to 30%. Moisture content closely controlled. Graduated temperature curve on wet end dryers, starting low to avoid cockling, curling, case hardening, breaks in sheet. Lower average drying temperatures and return of condensate to boilers at maximum temperatures effects steam saving up to 20%—several thousands of dollars in any mill—alone sufficient to pay for system in couple of years. If not Fulton-equipped, join the 75%.

SIGHT-FLOW CONDENSATE INDICATORS

Double-check condition of your dryers. Install Ball sight-flow indicators on return headers, make certain of ample condensate flow and check the temperature. Avoid sins of faulty drying—cockling, curling, case hardening, excessive broke losses. Pyrex glass ball "window" positively will not cloud over but stay clear at all times. Non-corrosive equipment and good for many years. Inexpensive. Easy to install. Nothing to wear out.

AUTO-FLEX SYPHONS

Overcome faults of ordinary syphons. Don't discount that statement and smile because it is a literal fact and can be proved—is being proved every day in the year. This equipment positively stays in position and insures entire removal of water and air from dryers. Will fit any dryer. Easy to install. No adjusting when being installed or afterwards. Syphon easy on steam joint. Try a few and see for yourself.

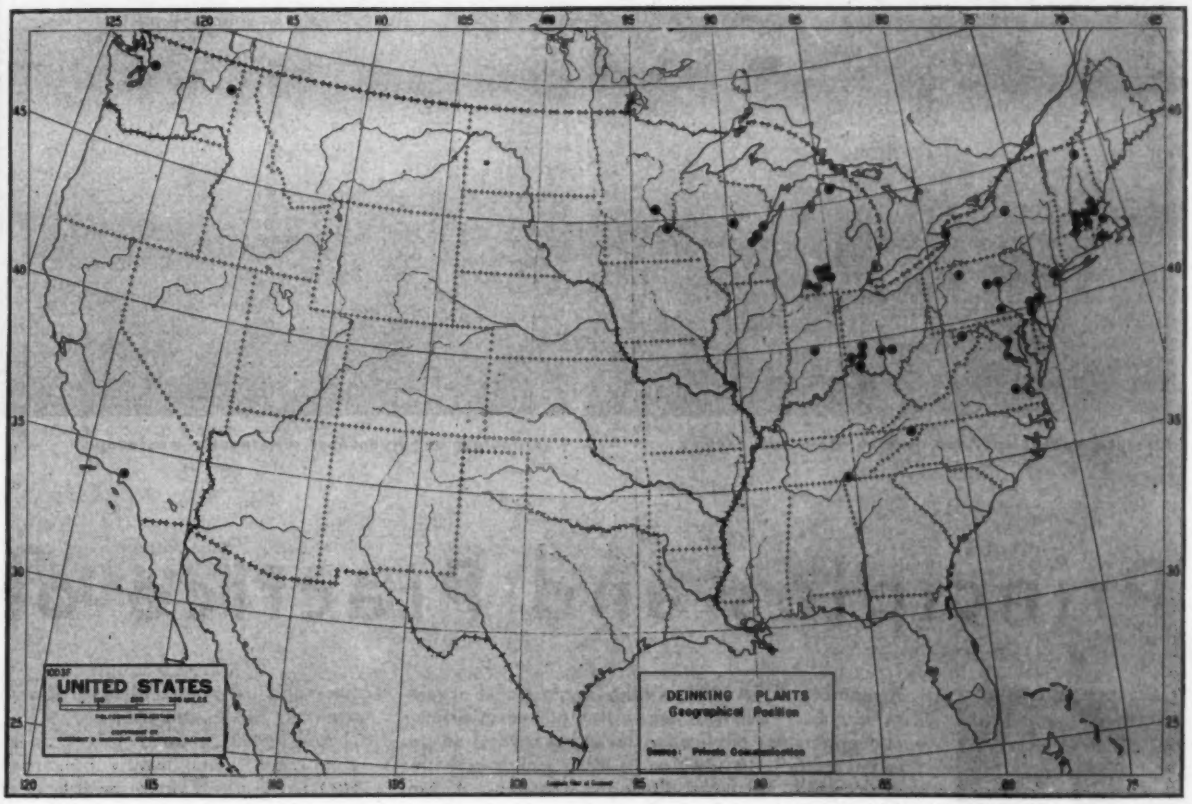
PROPELLER AGITATION

Properly designed chests and effective agitation of the stock in them is just as important as pulping, beating, jordaning, pumping, or any other mill operation. Midwest can engineer chests to meet the mill layout and agitation requirement; also build the agitator. Single- or multiple-blade agitators for horizontal or vertical operation as required. Consult us on agitation.

MIDWEST-FULTON

THE MIDWEST-FULTON MACHINE CO., DAYTON 2, OHIO

An entire generation of experience with mill problems is available thru the Midwest organization. Engineers in principal papermaking areas. Write Dayton to have the nearest representative contact you.



Courtesy, National Council for Stream Improvement

About 50 paper mills in the United States produce pulp by deinking wastepaper

Deinking of Printed Papers

A SYMPOSIUM

RECOVERY of wastepapers by deinking long has been practiced in this and other countries. Its economy is derived from the ready availability of wastepaper and the over-all low cost of installing and operating deinking processes. Its importance is emphasized by the general efforts of the entire pulp and paper industry toward the greater utilization of fibrous raw materials.

Only in recent years has there been a noticeable trend toward modernization of deinking mills. Modern equipment as well as technological advances have played an important part in improving deinking processes. Even so, many mills are still using a variety of antiquated equipment previously adapted from other pulping processes.

In the past, an aura of secrecy surrounded deinking processes but in recent years many operating mills have shared their experience and knowledge and have co-operated to a considerable extent in the solving of common problems. Now, there are few secrets. Deinking processes have been discussed openly in technical meetings, and papers on various phases of the subject have been published.

In this symposium THE PAPER INDUSTRY AND PAPER WORLD brings you an up-to-date report on the principles and practice of deinking processes. Here, in one comprehensive treatment, the facts of deinking are discussed candidly by men who are recognized authorities in their respective fields.

Principles and Practice of Deinking Processes
Alfred H. Nadelman

Deinking at St. Regis Paper Company
Editorial Staff

Printing Inks
Roderick O'Donaghue

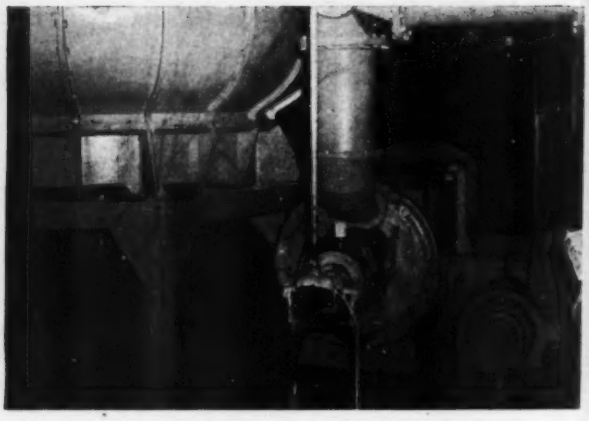
Alkali Deinking
Ralph L. Carr

Peroxides in Deinking
H. O. Kauffmann, R. L. McEwen, and F. R. Sheldon

Silicates in Deinking
Everett W. Turley

Waste Disposal Problems
Anthony J. Palladino

Pressure Hydrapulper for disintegration and cooking



Hydrapulper and Hydrafiner disintegrate wastepaper

Principles and Practice of

A member of TAPPI and other professional organizations, Dr. Nadelman has written numerous articles and papers for publication including several on deinking studies. In addition to his teaching activities at Western Michigan College, where he is professor of Pulp and Paper Technology, Dr. Nadelman acts as consultant to a number of pulp and paper manufacturers. Prior to joining the College, he was associated over a period of several years with such firms as Milprint, Inc., Glassine Paper Company, and International Paper Company.

ALFRED H. NADELMAN

▶▶▶ PULP FROM DEINKED printed papers, often referred to as secondary stock, is a desirable and useful papermaking raw material. Blended with virgin pulp, it produces high quality papers. On the paper machine it exhibits good forming characteristics with satisfactory retention of size and fillers.

The main reason for the use of deinked stock is its relatively low cost. Prices of wastepaper are usually considered attractive when compared to other fibrous raw material. Investment in buildings and equipment per ton of pulp produced is far lower in the case of a deinking plant than in the case of a chemical pulp mill. Furthermore, deinking serves our economy by converting a waste product into a useful commodity. By using secondary stock, we strengthen our forest reserves and reduce our demand for domestic and imported virgin pulps.

Importance of deinking of printed papers is evident from the fact that over fifty mills in this country produce paper from deinked stock. Grades produced range from book, magazine, writing and envelope papers to tissues, newsprint and similar grades.

Wastepaper Used

Number one books and magazines furnish the bulk of raw material for deinking and are generally considered easier to deink than other grades. However, some mills find it difficult to remove rotogravure inks and polymeric hot melt adhesives used in binding of certain magazines. These difficulties can be overcome by mechanical cleaning of deinked stock.

Colored ledger, sometimes referred to as No. 1 mixed ledger, is another important source of secondary stock. Experience of some mills indicates that the presence of specialty inks, plastic coatings and printers' make-ready sheets with heavy accumulations of ink, prevent thorough deinking. Wet strength papers in colored ledger are another source of trouble, since they are difficult to recognize and hard to disintegrate. Therefore, these mills prefer number one heavy books and magazines and use colored ledger only in relatively small proportions.

At present, colored ledger is an economical grade because of current attractive prices. Due to the absence of groundwood and the limited amount of filler, the shrinkage in deinking and bleaching is lower than in the case of No. 1 books and magazines.

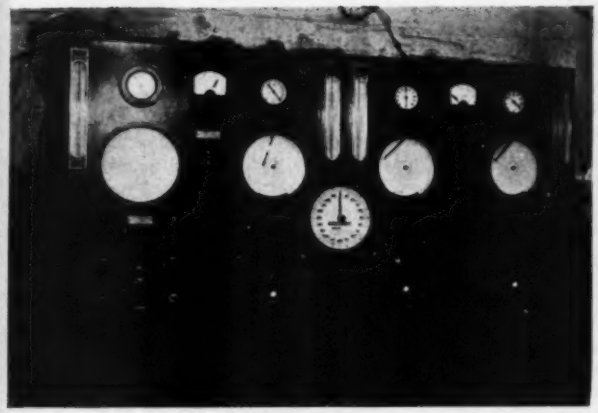
Number one news and overissue news are used by the mills producing newsprint from secondary stock. Other grades of wastepaper, such as tabulating cards, are also used when available.

Wastepaper grades are defined by the recently established standards of the Waste Paper Institute, a division of the National Association of Waste Material Dealers, adopted March 22, 1949. Definitions of these grades commonly used in deinking are shown in Table 2. In addition to these standards, the Office of Price Administration, in 1946, issued wastepaper definitions *(1)* that could well be considered as minimum quality requirements.

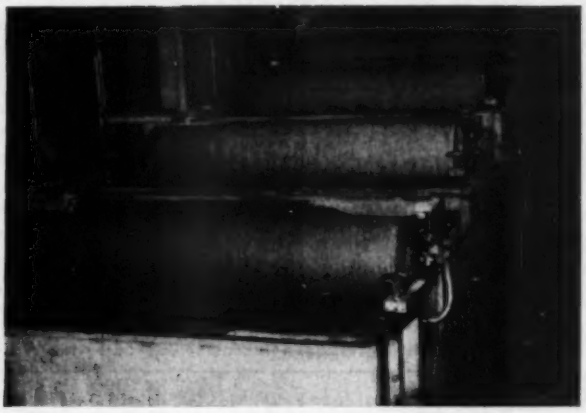
Wastepaper for deinking should contain a minimum of prohibitive material and outthrows such as indicated in Table 2 under the specification of No. 1 Heavy Books and Magazines. This material should be completely removed before the wastepaper reaches the mill. Many packers of wastepaper are now prepared to furnish special packings to meet the requirements of their customers.

However, most wastepaper, especially lower grades, must be inspected and sorted to remove undesirable materials. Continuous sorting is the most economical type of operation. Inter-

Adapted from one of the Black-Clawson-Shartle-Dilts lecture series, at Shartle Bros. Machine Co., Feb. 8, 1949.



Control panel in a modern deinking mill



Four-stage counter current Sheld washer

Deinking Processes

mittent sorting may be an expensive operation, if the sorters are idle between filling and dumping of the equipment used for initial disintegration. The use of dusters and shredders, once very important steps in deinking, is gradually becoming obsolete. A recent German publication *(2)* recommends dusting by use of a conveyor belt made of coarse wire netting. This method has been used for several years by domestic mills with good success.

In deinking book, magazine, and ledger stock, caustic soda is the basic material used. Three to six per cent based on the air-dry weight of waste papers is employed. The caustic soda is partially converted into sodium carbonate during the cooking cycle. Only about one half of one per cent of the alkali is actually consumed during the cooking operation *(3)*. Soda ash alone or together with caustic soda is also used for cooking of book, magazine and ledger stock.

Chemical Action

A generally accepted explanation of the deinking mechanism is that alkalis neutralize the alum in the paper, saponify the natural resins as well as sizing, and react with dried vehicles of ink.

In recent years, peroxide together with caustic soda or sodium silicate have been used successfully *(4)* in deinking of groundwood containing magazine stock. While the cost of chemicals per ton of paper is higher than in the case of straight caustic soda or mixtures of soda ash and caustic soda, several advantages are claimed which more than compensate the increased cost of chemicals.

As to the effect of peroxides in deinking, it may be assumed that the chemical inhibits discoloration of groundwood caused by caustic alkali. Furthermore, peroxides modify and solubilize some ink vehicles and the starch which forms a layer between the ink and the fiber on machine-coated and tub-sized printed papers.

Deinking of newsprint requires the selection of different chemicals. Since newsprint contains hardly any filler, the beneficial absorptive effect of the fillers found in ledger, book and magazine stock is missing. Furthermore, the absence of rosin size in newsprint eliminates the possibility of forming adequate quantities of rosin soap with alkalis. Sodium silicate, synthetic detergents, petroleum sulfonates, tall oil

TABLE 1—Steps in Low Density Deinking

Type of Operation	Consistency	Equipment	Comments
Sorting Dusting	— —	Wire belt conveyor	Manual inspection
Initial disintegration	4-9%	Breaker beaters, pulpers, etc.	Temp.: 120-210 Fahr. Time: 45 minutes Batch or continuous, chemicals added
Cooking	4-9%	Cooking chests or digesters with circulation	Temp.: 120-210 Fahr. Time: 2-6 hours May be combined with disintegration
Refining (final disintegration)	4-9%	Any type of refiners	May be combined with cooking
Primary removal of heavy dirt	0.75-1.0%	Riffers, settling cones, centrifugal pressure drop equip.	Continuous
Coarse screening	0.75-1.0%	Vibrating screens	Continuous
Washing of unbleached stock	0.75% thickened to 9.0%	Multiple unit cylinder washer	May be combined with vacuum washer
Bleaching	4.5-7%	Tower or chest	Temp.: 100-110% Time: 2-4 hours Continuous, or batch one- two- or three-stage
Fine screening	0.75-1.25%	Flat or rotary screens	Tailing screens should be used
Final dirt removal	0.75-1.25%	Centrif. pressure drop equipment	May be located ahead of paper machine
Final washing and thickening	0.75-1.25% thickened to 4.0-5.0%	Vacuum washer	———

soap together with sodium carbonate or caustic soda are often recommended. Sodium peroxide or hydrogen peroxide are used as color stabilizers. The use of an absorptive material such as bontonite in deinking of newsprint has been advocated by Wells *(5)*.

In certain types of operations, mixtures of sodium carbonate, tetrasodium pyrophosphate, sodium metasilicate together with synthetic detergents are considered useful.

Types of Deinking Processes

There is no uniformity in the operations of different deinking mills. Availability of equipment and floor space govern the selection and sequence of operations. Since many of the mills producing deinked stock are converted rag paper mills, the influence of their past can be still noticed at present.

Basic principles are the same for all deinking processes. The first major step of operations, namely, mechanical disintegration and treatment with chemicals at elevated temperatures, may be accomplished at low density (4 to 9 per cent consistency) or at high density (25 to 35 per cent). Both processes may be preceded by sorting and dusting and are followed by washing, bleaching, screening and mechanical dirt removal.

TABLE 2—Certain Wastepaper Grades as Defined by the Waste Paper Institute

No. 1—Repacked Heavy Books and Magazine. Consists of dry, clean, used, and overissue books and magazines, stitchless stock, quire waste and similar printed matter and may contain such bleached sulphite and sulphate books and magazines adulterated with fine groundwood as are acceptable to the consumer. This grade shall be packed in machine-compressed bales, securely wired, weighing not less than 1,000 pounds, or in air-compressed bales weighing about 150 pounds. Outthrows—including coarse groundwood papers, newsprint magazines, so-called pulpwood magazines, novel news, all other papers containing coarse or shivey groundwood, hard backs, unbleached kraft covers, gilt, aluminum, varnished, heavily inked poster paper, lithograph, rotogravure, labels, deep-colored printing, wet and dirty paper, may not exceed 2 per cent. Prohibitive materials—including ink wads, laminated, waxed, black, brown or blueprint, cellophane, wet strength, parchment, carbon paper, dirt trash, rubber, rags, strings, sweepings, rotted or burned stocks, or any other type or grades of stock as may be designated by the buyer from time to time, none permitted; tare may not exceed 2 per cent.

Mixed Books and Magazines. Consists of clean dry books and/or magazines and similar printed matter in bales, bags, boxes or bundles. Books and magazines not acceptable in packing of No. 1 Repacked Heavy Books and Magazines, may not exceed 20 per cent of the total weight of the shipment. Outthrows—including a maximum of 2 per cent of prohobitive materials, may not exceed 5 per cent.

No. 1—Mixed Ledger. Consists of white and colored sheets and shavings of ledger, bond, writing papers and other hard papers which have a similar fibre content. This grade may include bleached sulphite or sulphate papers containing a trace of groundwood. This grade shall be packed in machine-compressed bales, securely wired, weighing not less than 800 pounds. Outthrows may not exceed 2 per cent; prohibitive materials, none permitted. Tare may not exceed 2 per cent.

Super Manila Tabulating Cards. Consists of printed manila-colored cards, predominantly sulphite or sulphate, which have been manufactured for use in automatic tabulating machines. This grade may contain manila-colored tabulating cards with tinted margins but may not contain beater or calender-dyed cards in excess of ½ of 1 per cent. This grade may be shipped in securely wrapped bales, or in bags, or in cardboard boxes. Outthrows may not exceed 1 per cent; prohibitive materials, none permitted.

Manila Tabulating Cards. Consists of printed manila-colored cards, predominantly sulphite or sulphate, which have been manufactured for use in automatic tabulating machines. This grade may contain manila-colored tabulating cards with tinted margins but may not contain beater or calender-dyed cards in excess of 5 per cent. This grade may be shipped in securely wrapped bales, or in bags or cardboard boxes. Outthrows may not exceed 1 per cent; prohibitive materials, none permitted.

Colored Tabulating Cards. Consists of printed colored cards, predominantly sulphite and sulphate, which have been manufactured for use in automatic tabulating machines. This grade may be shipped in securely wrapped bales or in bags or cardboard boxes. Outthrows may not exceed 1 per cent; prohibitive materials, none permitted.

New Colored Envelope Cuttings. Consists of baled colored envelope cuttings, shavings or sheets of colored papers, predominantly sulphite or sulphate, free of all printing. Outthrows may not exceed 2 per cent; prohibitive materials, none permitted.

Tinted Shavings. Consists of baled shavings and sheets of all-white sulphite papers. This grade may contain not over 10 per cent of light-colored tint printing. This grade may contain sulphite papers containing a small percentage of groundwood. Outthrows may not exceed 1 per cent; prohibitive materials, none permitted.

No. 1—Flyleaf Shavings. Consists of baled trim of magazines, catalogues and similar printed matter. It may contain the bleed of cover and insert stock to a maximum of 10 per cent of dark colors, and must be predominantly sulphite. Beaterdyed papers may not exceed 2 per cent. Shavings of novel news or newsprint grades may not be included in this packing. Outthrows may not exceed 1 per cent; prohibitive materials, none permitted.

No. 1—News. Consists of newspapers packed in bales of not less than 54 inches in length, containing less than 5 per cent of other papers. Outthrows—including a maximum of ½ of 1 per cent of prohibitive materials, may not exceed 2 per cent.

Super News. Consists of repacked fresh newspapers, not sunburned, packed in bales of not less than 60 inches in length, free of papers other than news and containing not more than the normal percentage of rotogravure and colored sections. Outthrows may not exceed 2 per cent; prohibitive materials, none permitted.

Over-Issue News. Consists of unused overrun regular newspapers printed on newsprint, baled or securely tied in bundles, and shall contain not more than the normal percentage of rotogravure and colored sections. Outthrows, none permitted; prohibitive materials, none permitted.

Outthrows. The term "Outthrows" . . . is defined as "all papers that are so manufactured or treated or are in such a form as to be unsuitable for consumption as the grade specified."

Prohibitive Materials. The term "Prohibitive materials" is defined as (a) "Any materials which by their presence in a packing of wastepaper, in excess of the amount allowed, will make the packing unusable as the grade specified." (b) "Any materials that may be damaging to equipment." Note: The maximum quantity of "Outthrows" indicated in connection with the foregoing grade definition is understood to be the total of "Outthrows" and "Prohibitive Materials."

Low Density Systems

Low density disintegration and cooking is used by the majority of the deinking mills. The stock is mixed with hot water and chemicals in a centrifugal pulper, breaker beater, or in any of the common types of disintegrating devices. The disintegrated stock is removed through extractors having perforations from three-eighths of an inch to one inch. Consistency ranges from 4 to 9 per cent. The initial disintegration may be a batch process or, preferably, a continuous process. Operations and equipment are outlined in Table 1.

A recent publication *(6)* shows that an impeller-type centrifugal pulper produced in continuous operation partially disintegrated stock, 77 per cent of which was fully deinked and disintegrated. These findings are not surprising if one considers the fact that most of the fibers in a sheet of paper do not come in contact with ink during the printing process.

In many cases, initial disintegration is followed by cooking. Stationary cookers or cooking chests are used. The temperature range is 160 to 210 Fahr. Most systems have circulating pumps which, in some cases, discharge against a target. Good circulation or agitation is of paramount importance in cooking. A complete cycle may last from two to five hours, depending on the type of equipment, the temperature, the concentration and type of chemicals and grades of waste paper.

Some mills have found it desirable to combine initial disintegration and cooking and to eliminate the use of stationary cookers or cooking chests. Refiners are used after the cooking equipment. In some cases, the stock is circulated through a refiner during the cooking cycle, making possible relatively short cooking periods.

Alkali and Heat Recovery

Considerable savings in low consistency systems can be realized by alkali and heat recovery. Since only about one-half of one per cent of alkali (based on weight of wastepaper) is consumed in cooking, and since much larger quantities of alkali are used to obtain speedy deinking, the deinked stock should be separated from the cooking liquor by means of a vacuum

filter. The recovered hot liquor, containing alkali and soaps of rosin and fatty acids, may be re-used for initial disintegration and cooking of wastepaper. This process has been used to good advantage in actual production by different deinking mills.

High Density Systems

High density disintegration *(7)* is used to a limited extent. Wastepaper is fed together with chemicals, water, and steam into a pulper of the Lannoye type, is disintegrated and deinked while in the pulper and discharged continuously at 30 to 35 per cent consistency at 155 to 200 Fahr.

High density disintegration may be followed by low density cooking and/or refining to obtain thorough deinking. Here, cooking takes place in a circulating chest. While the above high-density methods are used infrequently, a number of mills still use cylindrical or globe rotaries for cooking of wastepaper. Dry paper is fed into the cookers together with hot water and chemicals. The consistency of the stock in the cookers is about 25 to 35 per cent. The pressure is raised to fifteen pounds or even thirty pounds. A cooking cycle lasts from three to eight hours. The cooked stock is discharged into pits, diluted, and pumped to the washers. If they are of the Hollander type, gradual lowering of the beater roll completes disintegration. If multiple unit washers are used, this step of operation is preceded by passing the stock through a refiner.

Rotary cooker systems have low power and steam consumption. Despite these advantages they are gradually being replaced by low consistency disintegration and cooking.

Removal of Heavy Dirt

Cooked stock sometimes contains a small quantity of heavy and coarse dirt such as staples, paper clips, sand, pieces of plastic binder, cellophane, wet strength paper and string. Vibrating screens with 3/16 inch holes, conical settling devices, as well as centrifugal pressure drop equipment, are used to remove such material. While rifflers are found in many mills, they require an excessive amount of floor space and remove heavy dirt only if the stock is run at proper consistency and velocity. Here, the velocity at a depth of 24 inches should be not less than 40 fpm and the consistency should be in the range of ¾ to 1.0 per cent.

Washing Unbleached Stock

Washing of unbleached stock results in removal of dissolved and suspended solids. A typical screen analysis *(6)* of unbleached stock before and after washing yielded the results shown in Table 3.

TABLE 3

Retained on screen (mesh)	Results of suspended solids before washing (per cent) Before washing	Effluent	After washing
4	0.0		0.0
10	1.0		1.1
14	4.7		4.7
20	7.4		7.4
35	16.1		16.1
42	5.3		5.3
65	9.0	0.2	8.8
100	11.1	0.9	10.2
170	6.8	1.9	4.9
250	3.5	1.2	2.3
*250	35.0	27.8	7.2
(*) Passed through screen			
Total	100.0	32.0	68.0

Multiple unit decker type washers with couch rolls are in wide use. Combinations of vacuum washers with decker type washers reduce fiber losses. If these combinations are used, special attention has to be given to the ash content of the washed stock. An ash content above 3 per cent indicates insufficient washing, and, consequently, incomplete removal of fine suspended matter which consists mostly of filler with absorbed ink or carbon black.

Several improvements in deinked stock washers have been made during the last few years. The Scheid *(8)* washer is a multiple cylinder unit consisting of vertically stepped vats in which cylinder molds and couch rolls are used to elevate and transfer the pulp from the lowermost to the highest vat. This washer permits the elimination of pumps for transferring the wash water from vat to vat in countercurrent washing. In another type of washer, the stock is removed from the cylinder face by air pressure, eliminating the use of couch rolls on non-vacuum equipment.

Hollander beaters with washing drums are used by some mills. This type of equipment is gradually replaced by more efficient washers.

If scale formation is encountered on the wires and doctor boards of washers, the use of about two parts per million of sodium hexametaphosphate in the dilution or shower water can be recommended. Details of this treatment have been published *(9)*.

Bleaching

Single-stage, two-stage and three-stage bleaching are commonly used in deinking. Single-stage bleaching is carried out with calcium or sodium hypochlorite bleach liquor. Two-stage bleaching uses a chlorination stage followed by washing before the hypochlorite stage. Three-stage bleaching incorporates a caustic extraction stage preceded and followed by washing between chlorination and hypochlorite treatment.

Bleaching may be carried out as a batch operation, or, preferably, as a continuous operation. The consistency in chlorination is 3 to 4 per cent. Higher consistencies are desirable in hypochlorite bleaching. The use of sodium hypochlorite bleach liquor is increasing. The advantages of sodium hypochlorite have been outlined by Poor *(10)* and have recently been re-emphasized by Woodside and Schuber *(11)*. Among the many merits of the sodium bleach, good solubility of the reaction product is an important factor. This permits thorough washing and results in improved brightness of the bleached deinked stock.

If the hypochlorite treatment is preceded by chlorination, the lignin in the groundwood portion is removed and the resulting pulp shows excellent brightness. On the other hand, shrinkage is considerable due to the removal of the lignin portion.

A caustic extraction stage may offer advantages, but has also certain drawbacks. In order to obtain the full benefit of caustic extraction, this operation should be carried out with 2 per cent caustic at 160 Fahr. and at high consistency *(11)*. Then, considerable losses in yield result from caustic extraction. However, if caustic is used at a lower temperature, this operation is simply a neutralization stage which may not justify the use of special equipment such as a retention tower and an additional vacuum washer.

Color Reversion

When discussing color reversion, one has to differentiate between color reversion of deinked slush stock in storage, color reversion upon addition of alum, color reversion on the dryers of the paper machine and color reversion of paper in storage.

Color reversion of deinked slush stock in storage is mostly due to inadequate *p*H control during the hypochlorite stage. Care should be taken to avoid acid conditions in hypochlorite bleaching. If excessive quantities of iron are present in the water used, further loss in brightness may occur as shown by Keller and Simmonds *(12)*.

Color reversion upon addition of alum can be observed quite often. If excessive, this type of color reversion indicates inadequate washing. Dissolved and suspended impurities are precipitated onto or attached to the fibers due to the high positive charge of the aluminum ions.

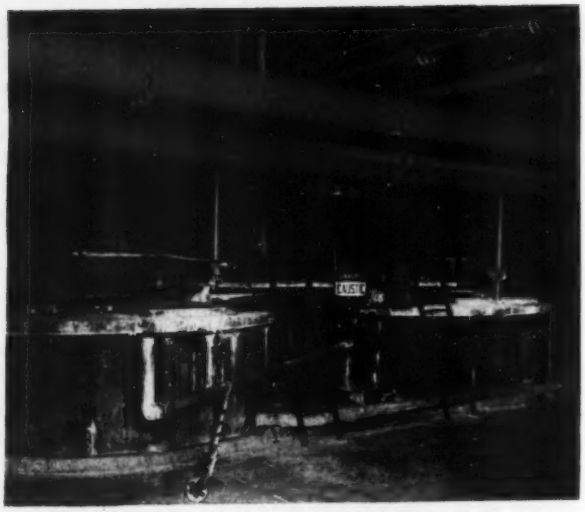
Color reversion on the dryers of the paper machine and color reversion of paper in storage are due to insufficient

(Turn to page 336)

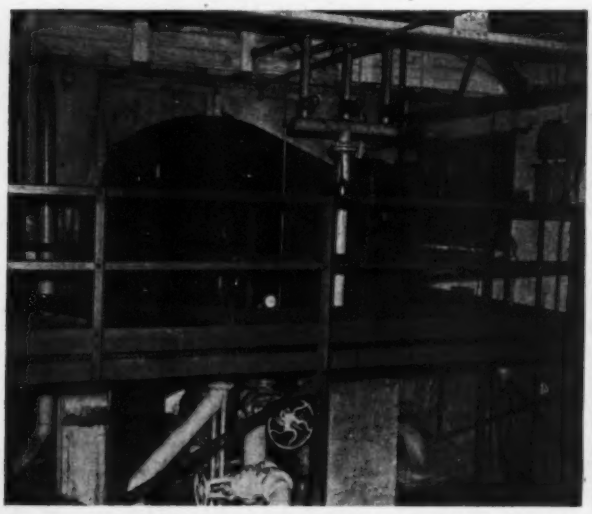
Deinking at the St. Regis Paper Co.

Editorial Staff

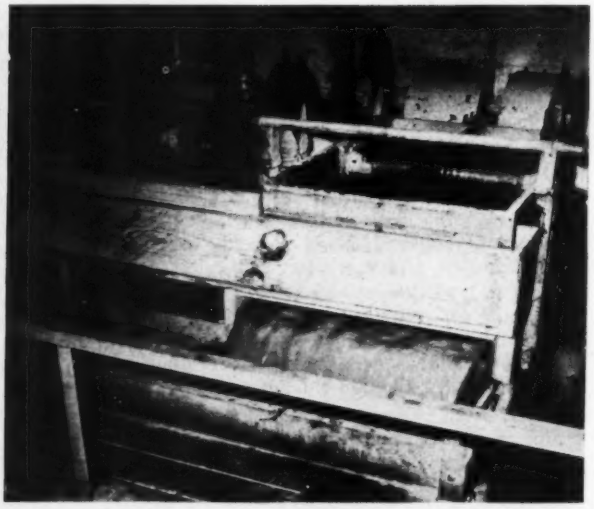
St. Regis has been a pioneer in the commercial development of processes for successfully deinking and bleaching wastepapers containing groundwood. This company's Kalamazoo, Michigan, mill, herewith illustrated, embodies equipment and processes that make its operation efficient and profitable. While some of the operations are not included, the following picture story does indicate the application of principles and equipment used in deinking.



1—Chemicals for deinking are mixed with water in two 5,000 gal make-up tanks

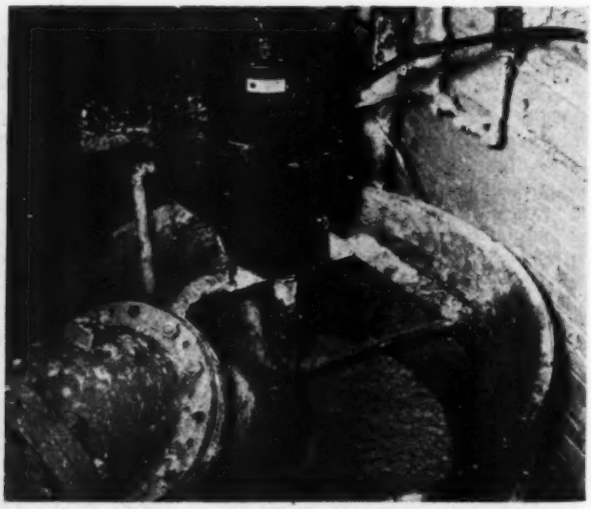


4—Filtrate containing alkali from Oliver washer is reused; heat is recovered from excess filtrate

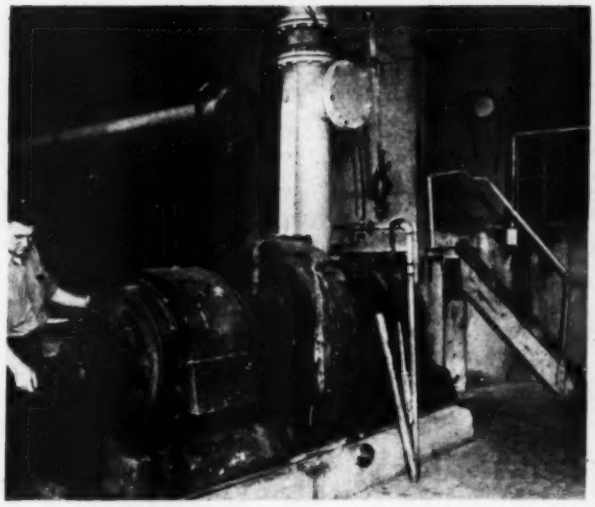


5—Coarse material is removed by Jonsson vibrating screens before stock goes to the flat screens

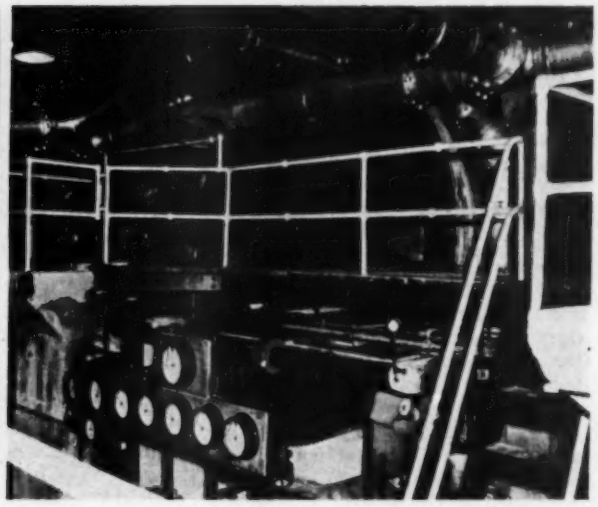
8—Stock is refined in Morden stockmaker—then bleached and washed again



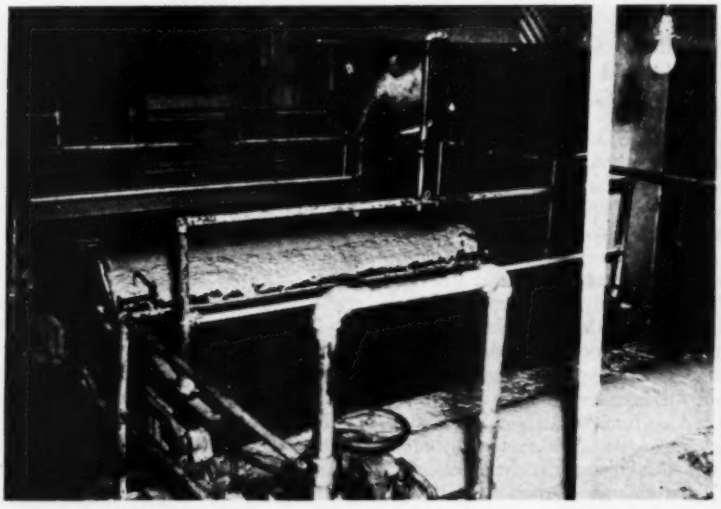
9—Bleached deinked stock is adjusted to 4% consistency in this DeZurik regulator



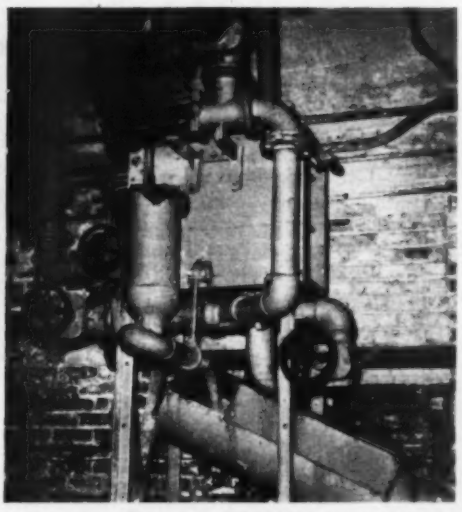
2—Wastepaper with chemical is disintegrated in Shartle breaker beater before going through Bauer refiner



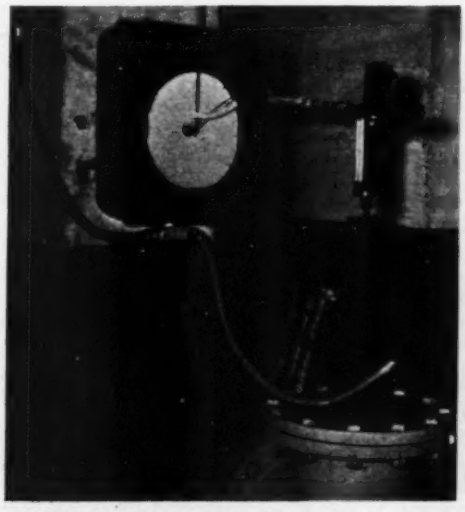
3—Disintegrated pulp is cooked with chemical in battery of horizontal cookers with recirculating pumps



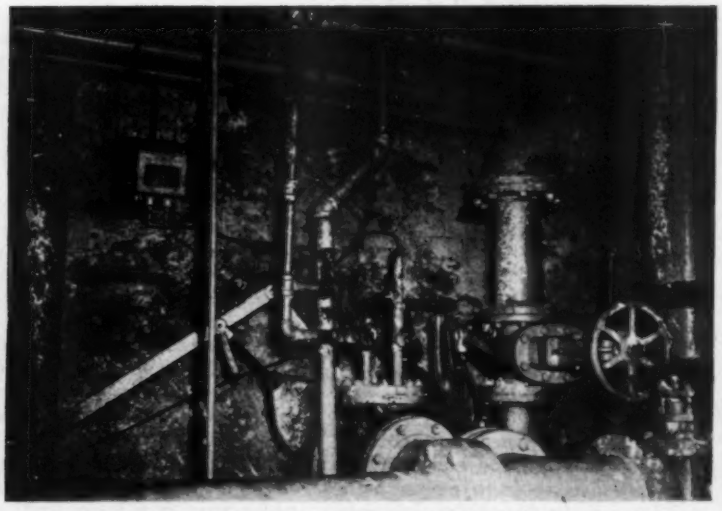
6—Screened deinked stock is washed on several batteries of 3-stage Lancaster type washers



7—Pulp consistency in unbleached chest adjusted by Trimbey regulator



10—Output is measured and recorded by a Fischer & Porter slush pulp rotameter



11—Pumps that transfer deinked stock to machine chests operated by Automatic Control Co. mercury switch units

Dr. Nadelman—*from page 333*

heat stability and permanency. These losses in brightness are encountered with deinked stocks as well as other types of chemical pulps. The discussion of these factors is beyond the scope of this paper.

Fine Screening

Bleaching is succeeded by fine screening. If flat screens are employed, submerged stock inlets should be used and care should be taken to have uniform laminar flow across the width of the screen plates. These and other facts published by Calkins *(13)* are worthy of thorough study and application. Eight, ten and possibly twelve cut screen plates are used for fine screening. Flat screen tailings should be rescreened on tailing screens. The accepted stock should be returned ahead of the primary flat screens and should make another pass through the whole screening system.

Primary flat screens may be replaced by rotary and centrifugal impeller type screens. If so, perforations ranging from 45 to 55 thousands of an inch are used.

Bleached deinked stock lends itself to washing and thickening on vacuum washers. In this step of operation, vacuum washers are definitely superior to decker type washers, since only soluble impurities are to be removed. The use of vacuum equipment holds fiber losses to a minimum.

Measuring Yields

Accurate records should be kept of the amount of waste paper going into the system as well as of the outthrow in sorting. Determinations of the dissolved and suspended solids in the sewer effluent can give some indication of the shrinkage in deinking. Reliable yield figures can be obtained only by actually measuring the production of deinked stock.

The double tank system preceded by consistency regulation measures the volume of stock at a definite consistency delivered from the deinking plant.

A new approach to the measuring of the quantity of pulp produced is the use of the recording and totalizing variable area rotameter. While this method has been used successfully by many groundwood mills for some time, its use in deinking mills is relatively new.

Trends in Deinking

Definite trends can be observed in deinking. The low consistency deinking method is about to replace more and more of the other known methods of deinking. Continuous systems will be the systems of the future in deinking as well as in bleaching. Multistage bleaching is about to replace single stage systems in many cases. Mechanical cleaning of deinked stock is assuming increased significance at a time when the market is competitive and mills and customers of the mills are more than ever quality conscious.

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Printing Inks

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▶▶▶ IN A STUDY OF deinking, consideration should be given to the composition of inks and how they are applied to the paper.

Two general types are used: the first type of ink dries by quick absorption of the vehicle by the paper; the second type dries without depending on this. The former type has its principal application on newsprint and groundwood specialty papers, while the latter is used for less absorbent papers that are sized and coated.

Inks are made up of a pigment and vehicle. The pigment is the finely divided material that gives color and body to the ink while the vehicle is the liquid in which it is suspended.

The pigment may be carbon as is commonly used in black inks or organic and inorganic colors used to make ink of various shades. Carbon is usually in the finely divided form known as carbon black. It is resistant to alkalis and soaps. Organic colors are commonly derived from coal tar, from which a large group of colors are obtained. When the color will dissolve in a solvent, it is not a pigment but is a dye. Some of these dyes can be removed by bleaching.

Inorganic colors are colored substances of mineral origin. They are divided into two general classes, namely, natural colored earths and precipitated inorganic colors. Most inorganic pigments used in printing inks are precipitated pigments. Visual or microscopic examination of a dry pigment shows it to be made up of a relatively wide range of particle sizes, ranging from 0.01 to about 44 microns.

The composition of the vehicle depends upon the use to which the ink is applied and may be composed of one or more of the following: Heat processed vegetable oils such as linseed, perilla, chinawood (tung), oiticica, dehydrated castor oil, etc.; menhaden fish oil alone or heat processed in combination with vegetable oils; vegetable oils in combination with resins, driers, with or without volatile thinner and waxes; petroleum or mineral oils of high and low boiling points with and without resins; resin with plasticizer and a volatile thinner; cellulose esters, plasticizer and low or high boiling solvent; casein water emulsion.

In general, however, the vehicle is made up of combinations of oils, resins, driers, thinners and special compounds.

The type of drying required in an ink largely influences the choice of resins employed. These are either natural or synthetic resins. The types of drying usually encountered in printing inks are oxidation, polymerization, condensation, penetration and absorption, and evaporation. Newsprinting inks, for instance, dry by penetration and absorption, aniline inks by evaporation, and tinplate inks dry to a hard film by means of heat where the drying is done mainly by polymerization, condensation and some oxidation.

Driers usually consist of a metallic salt such as derived from lead, manganese and cobalt and are used to speed up drying of the ink. Thinners are employed so as to control the consistency of the ink paste. Special compounds are used to quick set the ink, decrease tack, eliminate "picking" of the paper and prevent "offset." These are commonly lanolin, lard, soaps, tallow, waxes and combinations with various oils, asphaltum and resins.

Alkali Deinking

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Mathieson Chemical Corp.

▶▶▶ IN THEORY, the deinking of wastepaper is a very simple process. It merely consists of defibrating the paper stock in a water suspension, removing the filler, coating and ink particles by washing, after which the resulting pulp mass is bleached to the desired color. In practice, however, this seemingly simple operation is complicated by the fact that after paper is made and printed, it resists being returned to its original form.

When paper is placed in water it may be partially defibrated by subjecting it to the mechanical action of beater rolls or by violent agitation which causes the paper particles to rub together hard enough so that they are reduced to a pulp mass. However, complete reduction of the paper to pulp cannot be obtained unless something is added to the water suspension that will break down the bonds between the fibers and the bonds between the fiber and filler or coating and the ink. This can be accomplished very easily by the addition of from 1 to 3 per cent of an alkali, such as caustic soda, NaOH or sodium carbonate, Na_2CO_3. Sometimes, sodium metasilicate or trisodium phosphate are added with the caustic, or sodium carbonate, in order to enhance the action of the alkalies.

Action of Alkali

It readily may be seen that the alkalies have an important job to do in the deinking process. Their role is to aid in the breaking up of fiber bonds and to detach the coating, filler or ink from the paper fibers. They also aid in dispersing these particles, and, in some cases, react with them to form soluble substances. While the alkalies efficiently perform the above task, they do not have the ability to sufficiently emulsify these particles. In order to accomplish this, soap or a synthetic detergent is added to the deinking solution. These products tend to emulsify the ink and other particles, and to set up a repelling action between the fibers and these particles so that they may be more easily removed from the pulp by washing.

In the past, various types of equipment have been used to carry out the deinking process. In some cases the pulp is broken up and treated with the deinking chemicals in the same beater. Rotating globe and cylindrical boilers or stationary vertical boilers are also used to cook wastepapers. These boilers are usually operated at or slightly above atmospheric pressure. When a vertical boiler is used the cooking solution must be circulated by means of a pump. The rotary cooker depends upon its motion for agitation of the pulp mass and circulation of the solution. This action is said to produce a more uniform product than can be obtained from the vertical boilers. During the past ten years, many of the new deinking plants have been using what is commonly known as a Hydrapulper for both breaking up and cooking the stock.

Typical Beater Formula

A typical beater formula for deinking yellow pad paper and some selected types of magazine stocks is as follows: The stock is loaded in the beater and from 1½ to 2 per cent caustic is added on the dry weight of the paper. To this is added .5 per cent of soap, also calculated on fiber basis. The pulp mass is heated to at least 140 Fahr. and is beaten for one and one-half hours. Following this treatment, the stock is passed over rifflers, then washed and transferred to a bleach chest where it is bleached with .5 to 1 per cent available chlorine, fiber basis, at a *p*H of 8.5 and a temperature of 98 Fahr. Bleaching is allowed to continue until the desired brightness is reached.

When digesters are used for cooking stock which is to be deinked, the charging stock may or may not be pretreated. In some cases the stock is charged directly to the digesters without sorting or dusting. In general, however, the stock is either cut up or beaten in a breaker beater before being charged into the digester. It is rather obvious that if the stock is given a pretreatment before being placed in the digester, the time cycle in the digester will be shortened.

One mill using the digester method operates as follows: The wastepaper is broken up in a breaker beater using water at 140 Fahr. Following the beating stage, the pulp is placed in a storage chest from which it is pumped to a cylindrical horizontal cooker of the rotating type. The stock is adjusted to 6 or 7 per cent consistency, and to this is added a solution consisting of 80 per cent sodium carbonate and 20 per cent caustic soda figured on a dry pulp basis. The stock is cooked at atmospheric pressure for a period of from three and one-half to five hours. It is then discharged from the cooker and flows to four stages of washing in Lancaster type washers. This is followed by a vacuum washer using hot water. The hot water from this washer is returned to the breaker beater.

This particular mill has found it advantageous to bleach the stock with sodium hypochlorite in preference to calcium hypochlorite. They have found that this gives them a brighter stock, because they are able to wash out all of the salts, and that the stock handled better on the wire. In this mill, bleaching is continued for from two to three hours and the brightness obtained is above 70.

In the more modern type of deinking plant, the equipment might consist of a Hydrapulper, riffler, screens, Vortraps, washers, a bleach chest and a stock chest. This plant would be operated somewhat as follows: About 2,000 gallons of water is added to the Hydrapulper and 1,500 pounds wastepaper is dumped to the water. Three per cent of caustic and .5 per cent of a synthetic detergent, both based upon the fiber weight, is added to the Hydrapulper. The temperature is then raised by steam injection to 185-190 Fahr. When book and magazine stock is used it is processed for about three-quarters of an hour in the Hydrapulper. Colored ledger requires from one to one and one-quarter hours.

Following treatment in the Hydrapulper, the pulp is passed over the riffler and screens. It then goes to two Vortraps, followed by three washers. From the washers, the pulp flows to the bleach chest where it is bleached with from .75 to 1 per cent available chlorine, fiber basis, as calcium hypochlorite. The pulp is left in the bleach chest for some six to ten hours depending upon the brightness desired. Following the bleaching cycle, the pulp is washed and placed in a stock chest.

This system will produce clean pulp which has a brightness of from 77 to 85 depending, of course, upon the severity of the Hydrapulper treatment and the amount of bleach added to the pulp.

In the above process from ½ to 1 per cent of sodium metasilicate can be added to the caustic in the Hydrapulper. This is said to aid in washing pulp cleaner.

Caustic Soda vs. Soda Ash

It should be pointed out that while a solution of straight caustic soda will speed up the deinking operation its action is harsher than that of soda ash. Experience has shown that there is a greater fiber loss when caustic soda is used than when using soda ash. However, this is more than offset by the time which is saved in treating the

stock. As indicated in some of the examples, some mills have found that a combination of soda ash and caustic soda gives them fairly rapid deinking with a minimum of fiber loss.

It is also obvious that wastepapers containing fairly high percentages of groundwood cannot be bleached to as high brightness as those which do not contain groundwood. Small amounts of groundwood will not interfere too much in the alkaline deinking process. However, where the wastepaper contains an appreciable per cent of groundwood, then other special treatments must be used.

In general, caustic soda is tending to replace sodium carbonate as an alkali for deinking paper. With the advent of more modern printing inks, it seems that it is necessary to use stronger alkalies than sodium carbonate, in order to quickly break down the ink so that it can be easily removed by washing.

Peroxides in Deinking

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▶▶▶ THE WIDESPREAD acceptance of peroxides as bleaching agents for mechanical pulp has led to their application in related fields of the pulp and paper industry. While almost any type of pulp can be bleached with peroxides, practical considerations usually favor their employment for treating groundwood or groundwood-sulphite mixtures. Recent trends toward a higher groundwood content in wastepapers naturally have revived interest in the use of peroxides for deinking. From the start of this century to the present, numerous suggestions have been made for incorporating peroxides in the deinking operation for papers containing large percentages of groundwood. Commercial application of peroxides in deinking systems is an outgrowth of these past suggestions and recent trends, and, above all, is a direct result of the wholehearted co-operation of deinking mills and their peroxide suppliers.

In most deinking mills, a conventional alkaline "cook" is used for paper disintegration and separation of ink from the pulp fiber. When subjected to such a treatment, papers containing appreciable amounts of mechanical pulp exhibit the well-known yellowing and darkening, typical of groundwood under the action of heat and alkali. The presence of peroxide in a deinking cook, however, eliminates this color reversion and actually results in a brightening of the base pulp stock. In addition, peroxide aids in defibering, ink separation, and modification of other constituents present, such as sizes, starches, and ink vehicles.

The use of peroxides in the deinking system is not, however, limited to its inclusion in the cooking formula. In fact, extensive mill and laboratory research has been, and is now being carried out to study the application of peroxide as a deinking and bleaching agent in different types of equipment at various stages of the deinking process for a wide variety of wastepapers. Results to date have shown that it is possible to obtain deinked stocks, the brightness and other properties of which approach those of fresh pulp.

Types of Paper

On the basis of production data it may be stated that enhanced results can be obtained by incorporating peroxide in any satisfactory deinking system for any type of paper. Papers best suited to peroxide application are those containing mechanical pulp. Waste news and magazines as well as the higher grades of book and ledger papers readily lend themselves to peroxide treatments. Since peroxide deinking is especially effective on high groundwood content papers, an increased proportion of these relatively low cost wastes may now be introduced into existing systems for a utilization of their advantageous pulp properties, heretofore limited by a lack of brightness. Of special interest in this connection, is the use of peroxide for newsprint deinking. Stock at brightnesses closely approaching those of groundwood has been produced commercially from waste news at a cost far below that of the virgin pulps.

Regardless of the type of paper to be treated, each application of peroxide to present deinking systems is an individual problem. This is due to the large number of variables encountered, such as variations in equipment, production rates, pulp storage times, water conditions, washing facilities, final stock usage, etc.

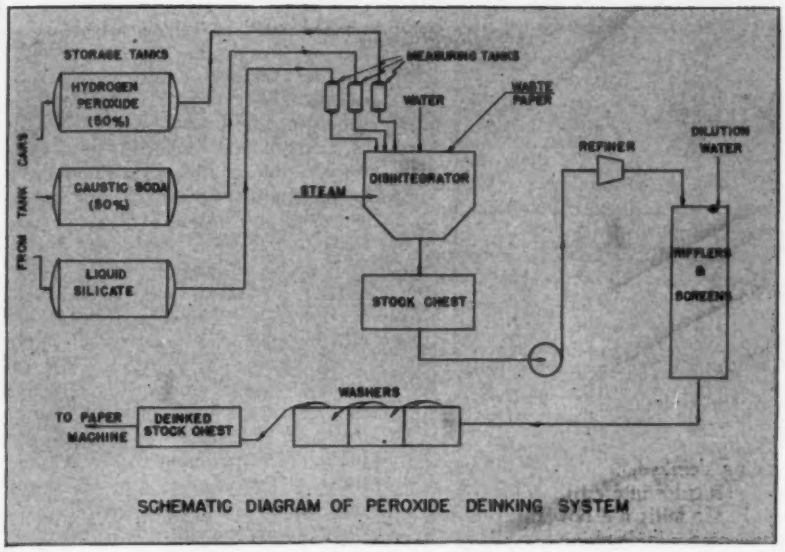
Equipment

At the present time, most mills are using peroxides in the initial defibering stage of a deinking process. Conventional mill equipment generally has proved adequate for such peroxide deinking. Hydrapulpers, breaker beaters, "tugboats," and the like have all been used. The use of peroxide for repulping in such equipment has shown it to assist in ink removal and defibering to an extent that lower temperatures and shorter times are possible at the disintegration and cooking stages. To achieve best results, peroxide should be introduced simultaneously with, or prior to, the alkali addition and should be present as long as the stock is alkaline and at elevated temperatures. Thus, type and quantity of chemicals, time and temperature play an important part in the treatment. Proper adjustment of these factors are necessary to obtain the highest brightness at the lowest cost. Formulae adjustments may be made to control the peroxide stability in alkaline liquors, and, thereby, to allow longer cooking. It is good practice, however, to avoid excessive retention of hot alkaline stock, and this factor should be considered in the choice of available equipment.

Peroxide may be used also after the washing stage to obtain appreciable brightness increases. Treatments at such a point resemble the peroxide bleaching processes now used for fresh pulp. As is the case in these bleaching operations, higher consistencies produce higher brightnesses. Thus, the most effective utilization of peroxide at this stage will, in the majority of cases, require suitable medium or high density equipment.

It is, of course, entirely possible to use peroxide at both the deinking and bleaching stages. For stocks composed predominently of chemical pulp, hypochlorite is usually employed at the bleaching stage. On such stock, use of peroxides in the defibering stage and hypochlorite in the bleaching stage produces more uniform pulp, valuable shade or tint effects, and decreases the amount of hypochlorite required. Higher brightnesses with less strength loss are thus achieved. On the other hand, if large percentages of mechanical pulp fibers are present in the stock, due to the darkening action of chlorine on groundwood, the use of chlorine or hypochlorite results in lower yields and lower brightness.

It is to be noted that basically the utilization of peroxide in wastepaper reclamation does not alter the proven principles of good deinking procedure. Nor does it obviate the need for a sound application of these principles in daily mill practice. Established operations and techniques are still of paramount importance. Good water and adequate washing remain prime factors,



SCHEMATIC DIAGRAM OF PEROXIDE DEINKING SYSTEM

as do proper screening and refining. Outstanding advantages attending a peroxide deinking system are, however, higher and more uniform brightnesses, greater production due to shorter treatments, lower steam consumption, and increased yields due to less fiber damage at the reduced temperatures.

Chemicals

The two most common, commercially available peroxides are hydrogen peroxide (H_2O_2) and sodium peroxide (Na_2O_2).

Hydrogen peroxide is available in various concentrations, the most convenient for mill use being 35 per cent and 50 per cent. Both chemicals are shipped in tank cars; the 35 per cent concentration is supplied also in 250-lb aluminum drums. These commercial H_2O_2 solutions are water clear liquids containing 16.41 per cent and 25.53 per cent active oxygen by weight and having a specific gravity of 1.131 and 1.195 respectively. They are non-hazardous and stable for long periods when properly stored. Hydrogen peroxide's ease of handling is one of its greatest assets. The commercial solutions may be transferred directly from tank car to storage tank and from there to point of use by means of pipelines and pumps. Since H_2O_2 is easily miscible with water in any proportion, it can be added directly to the stock. Weighing is entirely eliminated as the desired quantities are fed from a calibrated measuring tank.

Commercial sodium peroxide, a pale yellow granular solid containing a minimum of 96 per cent Na_2O_2, is supplied for mill use in 400-lb drums. When kept in its original sealed containers, it is stable for long periods. A corrosive alkaline oxidizing agent Na_2O_2 may cause combustion of organic matter in the presence of moisture. In wastepaper mills where considerable quantities of combustible materials and moisture are present, care must be taken to avert spillage. The use of less than drum quantities is to be avoided whenever possible. Pulp mills bleaching with sodium peroxide prepare stock solutions in sufficient volume to dissolve one or more whole drums of Na_2O_2.

Sodium peroxide, when dissolved in water, releases caustic soda, one pound of Na_2O_2 containing slightly more than one pound of caustic. Depending on the individual needs, this quantity of alkali may be greater or less than the amount required by the deinking application. Any excess has to be neutralized through the addition of sulphuric acid. The need for neutralization in such cases not only introduces the handling of another hazardous chemical but also brings into the system peroxide decomposing iron complexes which are generally present in the commercial acid.

Irrespective of the type of peroxide used, deinking with peroxide requires the same chemicals needed in conventional deinking systems. Caustic soda, soda ash, phosphates, and other common alkaline agents may be used alone or in combination. In addition, sodium silicate is included in the deinking formula for its stabilizing action on peroxides as well as for its dispersing and detergent properties. For peroxide bleaching of washed deinked stock, liquid silicates of relatively low alkali equivalence are used, while in peroxide deinking, a highly alkaline liquid silicate is preferred.

Of advantage in some cases is the use of various deinking assistants. The literature is full of suggestions for the addition of a wide variety of compounds which may improve a given deinking result. Their use in peroxide deinking produces similar additive effects. Natural soaps, synthetic detergents, dispersing and absorbing agents may all be incorporated in the peroxide deinking formula. The actual use of such assistants is largely a consideration of economics depending on the amounts necessary to achieve a substantial improvement in results.

To be considered also in the chemistry of any deinking process is the nature of the water employed throughout the system. Fresh water, iron free and not excessively hard, is best for use in the deinking stage with peroxides. Elsewhere in the operation, the same principles applying to water in conventional systems apply also to peroxide deinking. Where possible, fresh water washing at the final stages give optimum results, and recycling of decker and white waters should be kept to the minimum compatible with economical operation and mill water capacities.

The amounts of chemicals used for peroxide deinking will, of course, depend on the nature of the waste paper as well as on mill conditions, including equipment, production rate and final result desired. Generally speaking, the higher the groundwood content of the waste, the lower will be the amount of alkali and the higher the amount of peroxide required. Thus, based on the weight of the paper, total alkalinities equivalent to 3 per cent NaOH are in order for books and magazines, while for newsprint, a 1.5-2 per cent NaOH equivalent usually suffices. Corresponding 50 per cent hydrogen peroxide levels are approximately 1 per cent and 2 per cent.

Summary

By expanding the use which may be made of deinked pulp, peroxide has found a definite place in the field of wastepaper reclamation. It allows, in existing equipment, the commercial production of higher brightness stock than has heretofore been practical. By allowing also the recovery of pulp suitable for papermaking from wastes containing large amounts of groundwood fiber, peroxide has not only assisted in extending the country's natural resources but has also offered the papermaker a relatively low cost virgin groundwood substitute. Peroxide application, research and development, now merely in their earliest stages of growth, will have far reaching effects in the waste recovery field. It is hoped that laboratory and plant research and a continuation of the close co-operation of deinking mills and chemical manufacturers will bring forth even greater advances of benefit to the deinking industry.

Silicates in Deinking

EVERETT W. TURLEY
Philadelphia Quartz Company

▸▸▸ IN NEARLY ALL phases of pulp and paper manufacture the valuable properties of sodium silicates have been recognized. One of the interesting developments in paper production which came out of the recent war experience involved the use of silicates for the deinking of wastepapers. This was not new, for over 25 years ago patents on the effect of silicate for this purpose were beginning to issue. Since then, there have been many processes using sodium silicate for the removal of inks from printed surfaces. The newest method, which is the subject of this paper, involves the addition of sodium or hydrogen peroxide. In effect, this becomes a combination of deinking and bleaching.

The type of wastepaper to be treated, the equipment, and chemicals used in the operation determine the quality of pulp obtained. Deinking methods, therefore, vary considerably from mill to mill, but generally they may be classified into two groups. The rotary boiler method is one of the oldest, while the circulating method at least involves some newer equipment. Nevertheless, probably no two mills follow the same procedure exactly so that in actual practice many different steps and combinations of equipment are found.

Regardless of the equipment in which the wastepaper is treated, chemicals are needed to dissolve the binders in the ink, to saponify the oil bases and to keep such products suspended, so that they are removed in the washing operation, and do not appear in the new sheet of paper. The rosin size must be dissolved in order that the inks may be freed as a nonsticky material. Caustic soda and soda ash have been the chemicals used for the purpose either alone or in combination. Soaps have not been popular as they are poor rinsers, very often remaining in the pulp and redepositing some of the inks and oils.

Detergency

Deinking, it will be agreed, is fundamentally a detergent problem. The properties of silicate utilized in the process are wetting action, saponification of oily inks, dispersion of pigments, and protection of the pulp from reabsorbing the loosened soil. One of the particular virtues of the soluble silicate in deinking is the fact that the ink is lifted off the fiber. It is not dissolved off. Since the silicates are good dispersing agents and more important since they prevent suspended matter from redepositing, this behavior is important. It very definitely reduces the possibility of staining the fiber with ink particles or dyes.

Another factor of importance is that unlike stronger alkalies, such as caustic soda, the silicate alkali does not yellow groundwood stock. With an increasing amount of groundwood now being deinked, this feature should be of particular interest to mill operators.

Paper mills are now utilizing these advantages in deinking operations. Silicate combined with small amounts of caustic soda have proved superior to the caustic soda-ash combination. Silicates used with sodium or hydrogen peroxide are very successful. Caustic soda is not needed when sodium peroxide is used as it produces caustic in the reaction. Hydrogen peroxide produces equivalent results when used with an additional amount of caustic soda. The silicate-peroxide method increases the deinking costs only slightly, but vastly improves quality, thus adding to the dollar value of the end-product, the finished sheet.

Temperatures above 110 Fahr. in the deinking processes are desirable. Below this the chemical action on the inks is slow. Stain tests with phloroglucine hydrochloride show the groundwood fibers to be on the surface rather than a part of the mat, which affects the printability, especially of newsprint. Cooking temperature of 110 Fahr. (or above for newsprint) seems to result in a mat formed with groundwood inside rather than on the surface, which permits a sharper printing impression. This also serves to eliminate the black and white checkerboarding of solid black print.

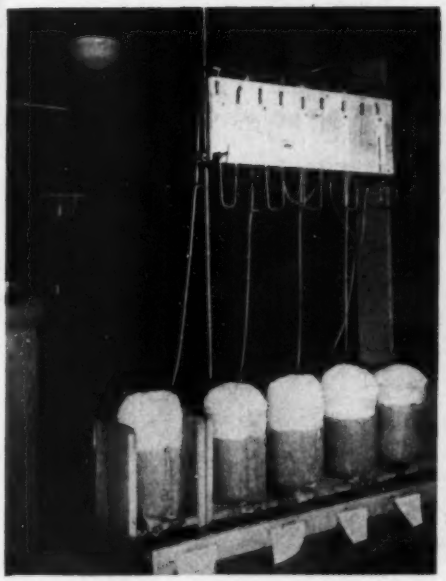
The most recent deinking work has been done with highly alkaline silicates (ratio of 1 part Na_2O to 1.60 parts SiO_2). The silicate performs an ink removal function beyond that which might be anticipated from alkali alone. The silicate of 1:1.60 not only contains the necessary alkali for action on inks and colors, but also the soluble silica holds inks and colors in suspension so that they do not redeposit on the fibers. Suspended in the liquor they may be easily washed out. The silica serves to buffer the alkali in order to prevent yellowing any groundwood that may be present in the pulp. The property of holding the materials in suspension so they can be easily washed out, is extremely valuable. For certain types of stubborn inks and colors the addition of a small amount of caustic aids in the initial wetting. This should not be in excess of 2 per cent as a larger amount would give a yellowish tint to the pulp should any groundwood be present. Excess caustic soda may also cause a loss of fiber strength.

The use of groundwood in papers today is increasing, some magazine papers containing as much as 60 per cent. Certain other types of papers require high whiteness. Where brightnesses around 70 are desired and where groundwood is used, either sodium or hydrogen peroxide is used in the deinking. The peroxide with silicate in the cook functions as a bleach operation, at the same time that the deinking reaction with the silicate is taking place. Silicate stabilizes the peroxide so that there will be no loss of oxygen when bleachable materials are not present. Peroxide bleaches that part of the stock which contains oxidizable material. The result is a brighter pulp of maximum strength.

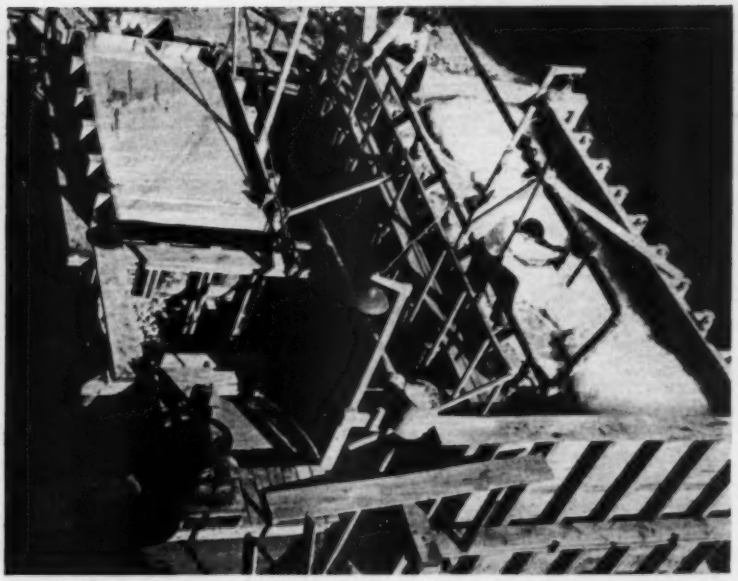
Chemical Combinations

Combinations of silicate, caustic soda and peroxide work best. General 3 per cent to 6 per cent silicate, ½ per cent to 2 per cent caustic soda and 1 per cent to 3 per cent peroxide are in use today based on the weight of wastepaper stock; one mill uses 5 per cent of 1:1.60 silicate, ½ per cent caustic soda and 1½ per cent hydrogen peroxide. The operation is carried out in a Hydrapulper at 120 Fahr. for 25 to 35 minutes. In this case the stock is not defibered prior to processing in the Hydrapulper. The same formula is used for both wastepaper and newsprint. Another formula consists of 6 per cent of 1:1.60 silicate and 1½ per cent sodium peroxide in a horizontal cooker at 160 Fahr., cooking from 60 to 90 minutes. The chemicals are added to a beater which defibers the stock and mixes the chemicals thoroughly before it is introduced into the cooker. This mill makes a coated book paper from this deinked stock.

In another operation with a Hydrapulper, low alkaline silicate (ratio 1:3.22) is used with caustic soda. The formula is 3 per cent of 1:3.22 silicate, 1½ per cent caustic soda, cooking at 150 to 170 Fahr. for 45 minutes. Peroxide is not used here as the stock is a high grade of waste book and newsprint containing very little ink or color. The lower alkaline silicates (1:3.25 or 1:3.22) can sometimes be used satisfactorily if additional alkali is provided by caustic soda. The caustic should not exceed 3 per cent, especially with groundwood stock.



Laboratory development of biological aeration of deinking waste



Pilot plant for treating deinking waste by biological aeration at Michigan Paper Co., Plainwell, Mich.

Waste Disposal Problems

A. J. PALLADINO
National Council for Stream Improvement

▶▶▶ AS A MAJOR PART of its program, the National Council for Stream Improvement (of the Pulp, Paper and Paperboard Industries) Inc., undertook a detailed study to determine methods of treating waste waters from the deinking process to reduce the polluting characteristics of these waters before discharge to receiving streams. Under a fellowship established at the Mellon Institute Industrial Research and subsequently by the Kalamazoo Project of the National Council for Stream Improvement the study was carried through the laboratory stages to the pilot plant stage by the end of 1947. The Mellon Institute fellowship under the direction of Dr. George D. Beal, assistant director, conducted a general survey to determine the extent of the problem, the basic nature of deinking waste, and the variations resulting from different mill practices, and conducted numerous laboratory investigations to determine the efficiency of various treatment measures.

The results of these studies *(1, 2)* are briefed here:

1—The sections of the country most affected by the deinking waste problem were found to be in southwestern Michigan, Massachusetts, and southern Ohio. Deinking mills also were scattered through other sections, notably Pennsylvania and Wisconsin.

2—The polluting characteristics of deinking waste were found to vary directly with the time, temperature, and causticity of the cook, and to decrease with the emphasis on mechanical rather than chemical defibering.

3—(a) The concentrations of Total Solids, Suspended Solids, and Biochemical Oxygen Demand and the waste water volume per ton of product were found to vary considerably from mill to mill. Representative figures for those characteristics, however, are depicted in Table 1.

(b) The amount of polluting material as measured by the five-day Biochemical Oxygen Demand (B.O.D.) Test was found to be about 120 to 200 lb/ton of pulp produced. About 70-90 per cent of this five-day B.O.D. was found to be in solution.

(c) On quiescent settling for 1-2 hours about 50-60 per cent of the suspended solids were removed. This resulted, however, in only about 20 per cent five-day B.O.D. removal. Chemical coagulation to further reduce the suspended solids was found to be impractical from a cost standpoint. Furthermore, it had little effect in further reducing the B.O.D.

(d) Preliminary investigation on aeration of waste indicated that reduction in B.O.D. up to 50 per cent could be attained by aeration for 10 hours.

Inasmuch as approximately 80 per cent of the five-day B.O.D. was found to be in solution, it was evident that methods beyond plain sedimentation or chemical coagulation were necessary in order to meet stream requirements successfully in some localities. However, the importance of the removal of settleable solids from deinking waste cannot be minimized, particularly in cases where the receiving stream due to natural or man-made topography is of low velocity. It has been demonstrated by extensive sanitary surveys conducted on such streams that sludge deposits resulting mainly from the settleable organic fraction of waste carried by the stream exert excessive oxygen demand and sometimes cause critical stream conditions in the vicinity of the deposits. Lagoons, if properly maintained, are an effective means of settleable solids removal. Some deinking mills practice lagooning. At least one deinking mill has facilities for waste clarification in a settling tank and vacuum filtration of the resulting sludge. Satisfactory filtration rates and sludge cakes are produced, the latter being trucked to a dump.

In 1946, the Kalamazoo Project of the National Council for Stream Improvement under the direction of

TABLE 1—Representative Analyses of Deinking Waste[3]

Total Solids	3500
Per cent volatile	45
Suspended Solids	2300
Per cent volatile	35
Suspended solids removed by 2-4 hours sedimentation per cent	70
5-day B.O.D.	600
B.O.D. removed by 2 hour sedimentation per cent	20
Total waste flow gal./ton/pulp produced	23000

TABLE 2—Effectiveness of Biological Treatment in Removal of B.O.D. from Deinking Waste (Laboratory Studies)[2]

	B.O.D. Removals Per Cent Aeration period, hrs.	
	9.5	19
No. NO_3 added	55–70	64–80
12.5 ppm $NaNO_3$ added	64–80	77–91

Philip F. Morgan, formerly chief development engineer, N.S.C.I., began laboratory studies directed toward reduction of the polluting potential of the colloidal and dissolved fraction of this waste. In a one-year study, a satisfactory method embodying biological treatment was evolved. This technique included the following steps:

1—Sedimentation for one hour to remove the settleable material with removal of the settled sludge.

2—Aeration of the settled waste for several hours (adition of $NaNO_3$ to stimulate biological growth).

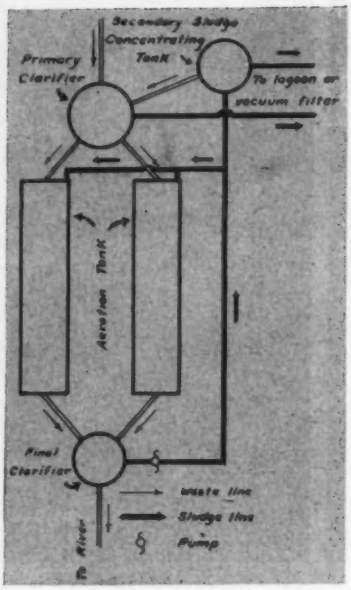
3—Final sedimentation before discharge to the stream with provisions for return of a fraction of the secondary sludge to the aeration tank in order to maintain high solids concentration therein.

The results obtained in these laboratory investigations were reported by P. F. Morgan at the 1948 annual TAPPI meeting *(3)*. A summary of the findings is shown in Table 2.

During the summer of 1947, a 60,000-gallon capacity pilot plant embodying the laboratory-developed biological treatment features was erected.

TABLE 3—Pilot Plant Results—Biological Treatment of Deinking Wastes[4]

	Average 105 days
Primary settling period	1.40
RAW WASTE	
Temperature Cent.	31
pH	9.4
Suspended solids ppm	2870
B.O.D. ppm	629
PRIMARY EFFLUENT	
Suspended solids ppm	1660
Per cent removal	38
B.O.D. ppm	472
Per cent removal	24
PRIMARY SLUDGE	
Vol. gal./day	610
Per cent of waste flow	1.6
Total solids per cent	8.8
AERATION TANK	
Aeration period hours	8.2
Air flow cu. ft./gal. waste	4.4
$NaNO_3$ added ppm	12.4
MIXED LIQUOR	
Suspended solids ppm	4906
SECONDARY SETTLING TANK	
Settling period hours	1.6
Return sludges per cent of waste flow	45
Waste sludge per cent of waste flow	5
FINAL EFFLUENT	
Suspended solids ppm	1050
Overall per cent removal	60
B.O.D. ppm	201
Overall per cent removal	68



Flow diagram of typical plant for treating deinking waste

This plant was in effective operation for four months, and although the waste reecived was about 30 per cent higher in suspended solids and B.O.D. concentrations, the results achieved paralleled those obtained in the laboratory tests. These results, together with summaries of all previous work *(4)* are presented in Table 3.

Although the pilot plant results indicated a successful method of treatment, there are some attendant difficulties. One of these is clogging of the air diffusers necessitating frequent maintenance. Another is the inherent difficulty of disposal of the sludge produced as a by-product of the treatment process. Lagooning studies carried on in conjunction with the operation of the pilot plant indicated that for a 40-ton mill there would be (allowing for compaction) an accumulation of primary sludge, in six months requiring three acre feet of lagooning volume. Roughly, the same volume would be necessary for lagooning the secondary sludge after compaction in sludge concentration tanks. There is evidence that upon freezing and thawing, the primary sludge will compact to about 50 per cent solids which would reduce somewhat the size of the required lagoon. Notwithstanding this possibility, however, it is evident that the lagooning volume may reach prohibitive proportions.

Vacuum filtration of the sludge as an alternatiive to lagooning was found through filter leaf tests to be feasible. Satisfactory filter loadings and sludge cakes were obtained with both primary and secondary sludge. However, sludge conditioning by addition of about 12-15 per cent CaO, based on the dry solids content, was necessary for the filtration of secondary sludge. There is evidence that the latter sludge may have some value as a soil conditioner, particularly if used in conjunction with sewage sludge. The use of filtered and pressed primary sludge as a wallboard also was investigated. Because of the denseness of this material and its somewhat variable nature, efforts to interest wallboard manufacturers in its utilization thus far have been unsuccessful. A possibility exists that after filtration it may be suitable for use in low grade paperboard manufacture.

As a sequence to these extensive studies, six deinking mills in the Kalamazoo area in 1948 formed the Kalamazoo River Improvement Company, which has as its aim the construction of the first full-scale plant in the Kalamazoo Valley for the treatment of deinking waste. This demonstration plant, which will be built at the site of the Michigan Paper Company, Plainwell, Michigan, will be modeled after the pilot plant and will be designed from the data obtained in the pilot plant operation.

Plans and specifications are now being prepared by National Council for Stream Improvement personnel and construction will begin in the near future.

The construction and maintenance will be financed jointly by the mills involved. Following a one-year period of operation, similar treatment units will be constructed at the other deinking mills if the operation is found to be successful. By terms of the agreement under which the Kalamazoo Improvement Company was formed, the Michigan Paper Company will be required to purchase the demonstration plant after three other mills have begun construction of similar treatment devices.

The study of the effectiveness of the process and the air diffusion and sludge disposal problems will be continued when the plant is in operation. It is hoped that this full scale plant representing the culmination of the successive stages of laboratory and pilot plant development will be a successful model for future deinking waste treatment installations.

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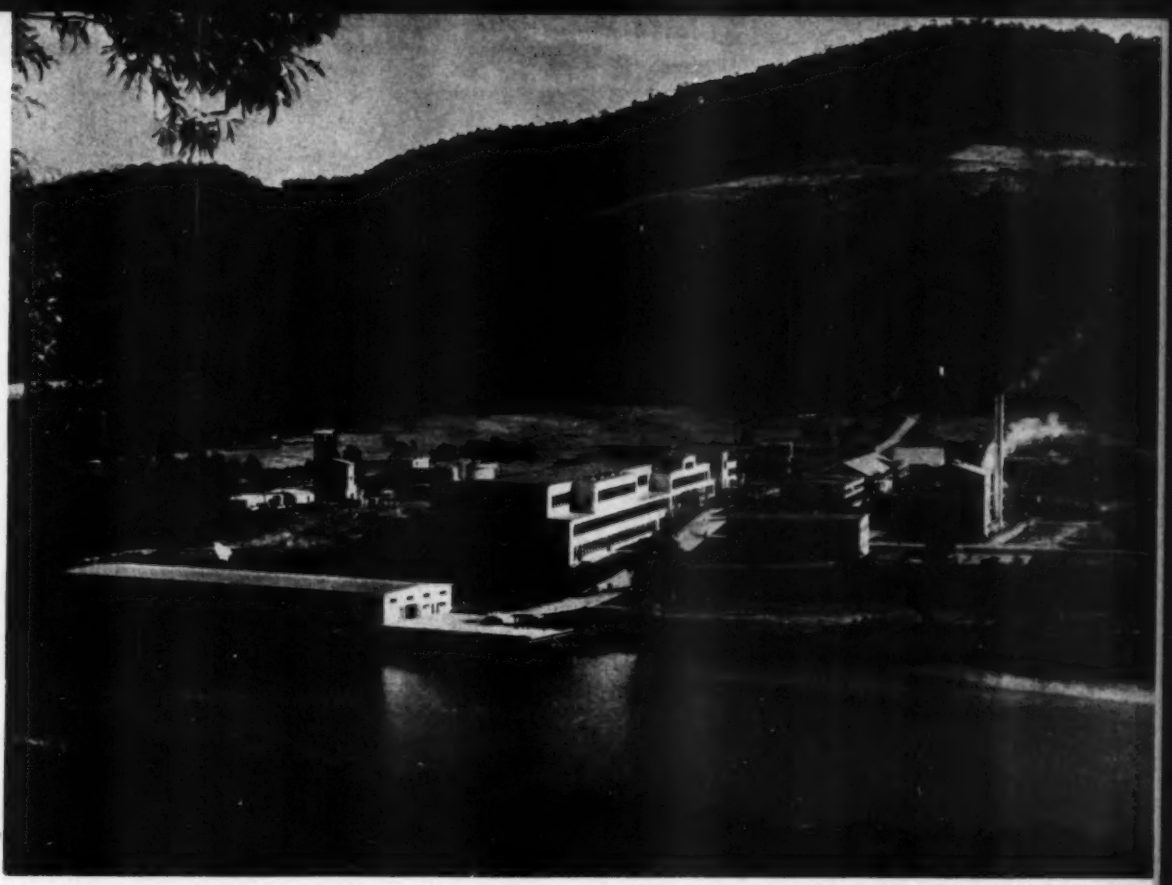


Australian Newsprint Mills Pty. Ltd., Boyer, Tasmania

Pulping of Hardwoods in Australia

EDGAR BEE

▸▸▸ THE SEARCH FOR techniques that would bring Australian hardwoods into use as a basis for paper stock was brought about through necessity. Australia lacked supplies of long-fibered softwoods such as spruce or western hemlock. Until comparatively a few years ago, the short-fibered hardwoods were considered totally unsuitable for papermaking.

Today, loggers are taking supplies of swamp gum (*Eucalyptus Regnans,* known in Victoria as mountain ash) and stringy bark (*E. obliqua*) from the forests back of Boyer and Burnie, Tasmania, to provide Australian pulp and paper mills with raw material for newsprint, printing and writing papers.

Australian woods, besides being short-fibered, are toughly bound and refractory. They contain much tannin which, combined with iron, forms ferric tannate. As ferric tannate is used to make blue-black writing ink (an unsuitable ingredient for paper) the problem of how to make paper not only strong-textured but clear-colored from Australian hardwoods was indeed a difficult one.

Research began at the forest products laboratories of the Council for Scientific and Industrial Research, in the 20's; it was pioneered by I. Boas, chief of the Forest Products Division, C.S.I.R. All the main varieties of the more than 500 kinds of eucalypts indigenous to Australia were tested. Most of these were eliminated. However, one of them, regnans, was considered suitable for groundwood, and two others, stringy bark (*E. obliqua*) and gum top stringy bark (*E. gigantea*), were found suitable for chemical pulp. It was from this beginning that the Boyer plant of Australian Newsprint Mills Pty. Ltd., and the Burnie plant of Associated Pulp and Paper Mills Ltd. were developed.

Apart from the eucalypts, scores of other Australian timbers were tested and rejected.

For a time, the pioneering research was concentrated on the soda process of making hardwood pulp chemically, and in this way the pioneers of the Boyer mill helped establish the Burnie mill—where fine writing and printing papers are made—before they themselves were able to enter the commercial newsprint field.

The big problem in research on groundwood was that the bond between fiber and fiber was, in all timbers except regnans, at least as strong as the fibers themselves. Thus there was a tendency for the fibers to break in the process of grinding. Regnans fibers have a bond between them weaker than the fibers themselves. And although they have a length of only 2 mm as compared with 5 mm for spruce, and a thickness of only one-eightieth of their length while spruce fibers are much thicker in proportion to length, the regnans fibers have the important advantage that the tearing process roughens them, and this roughness increases the strength of paper made from them.

For this reason about 85 per cent of the hardwood cut for the Boyer mill today is swamp gum. But 15 per cent stringybark is also cut—a proportion found suitable for groundwood. This gives maximum forest utilization.

Prevention of discoloration due to tannin and other wood acids involved many tests and, eventually, the use for plant and equipment of materials never before used for the purpose. Tannin gave the paper a bluish-grey tinge, with

Pulp machines grinding pulp from hardwood at plant of Australian Newsprint Mills Pty. Ltd. of Boyer, near Hobart, Tasmania

only 58 to 65 per cent brightness (purest white is 100 per cent "bright") in an experimental lot of eucalyptus newsprint made at Ocean Falls, B.C., in 1934.

In Tasmania, an experimental mill was set up in which the pulp could not come into contact with iron. It turned out paper with a brightness of 83 per cent. This was better than the best newsprint being made commercially anywhere at that time. To transform the conditions of this experimental mill into the conditions of a commercial one, tests were made with many varieties of stainless steel commercially available. For the 35-ton grinders (made by Charles Ruwolt Pty. Ltd., of Melbourne) an alloy containing 15 per cent chrome steel was selected. Instead of the usual iron and steel pumps and pipes, pipes were made from wood staves with rubber-lined steel bends, while aluminum bronze was chosen as the material for pumps. Some pumps for special purposes were made from 18 per cent chromium and 8 per cent nickel stainless steel. Concrete flumes and storage tanks, through which pulp passes were lined with glazed tiles set in and pointed with acid-resisting cement.

Further color improvement was provided for by plant to treat groundwood, still hot from the grindstones, with a zinc hydrosulphite solution. A special plant was installed to make the chemical, large quantities of which would be used.

Thus it was only after persistency and ingenuity in solving the special problems of the industry in Australia that manufacture was possible.

The establishment of the industry was beset with difficulties. An attempt to form a company on a fully co-operative basis, representing all large consumers, failed, largely because of doubts that persisted regarding quality and cost.

Finally, however, a group of newspapers comprising the Melbourne *Herald*, the Melbourne *Sun*, the Sydney *Morning Herald*, the Sydney *Sun*, the Brisbane *Courier-Mail*, the Adelaide *Advertiser*, the Adelaide *News*, and the Perth *West Australian* decided to put up the necessary capital and sign contracts to share the output in proportion to consumption on a cost plus basis.

Before the mill came into production, war broke out, and all newspapers in Australia with a consumption exceeding 1000 tons a year now share the output under identical contracts. The paper is scarcely distinguishable from Canadian if examined separately by a layman, and its cost today is approximately £5 a ton less. What the existence of the mill meant to the newspaper industry during the war never can be assessed.

Timber Areas Chosen

Boyer was chosen as the site because the Tasmanian hydroelectric scheme could provide plenty of cheap power; the Derwent River provided plenty of water, with year-round supply assured; there were large stands of suitable timber within reasonable distance, and some of the main chemicals to be used are manufactured only a few miles away. The company has a contract with the Hydro-Electric Commission for the use of a minimum of 10,000 hp continuously. There will be more power where needed after completion of expansions now in progress. A reforestation policy operates in the company's 400 square miles of timber concessions, and there is enough timber available, according to company estimates, to make 100,000 tons of newsprint a year in perpetuity.

Manufacture actually started in 1941, following a two-year period of construction and installation on the 56-acre site. The initial cost for buildings was £A250,000 and for machinery £A650,000. Sixty-five per cent of the plant and equipment was Australian-made. Besides the grinders, Charles Ruwolt Pty. Ltd., made washers and other heavy plant. Filtration and water treatment plant was made by Filtration and Water Softening Pty. Ltd., of Melbourne. After Australia, the next biggest supplier of plant and equipment was the United Kingdom; then the United States of Amerca, and then Canada.

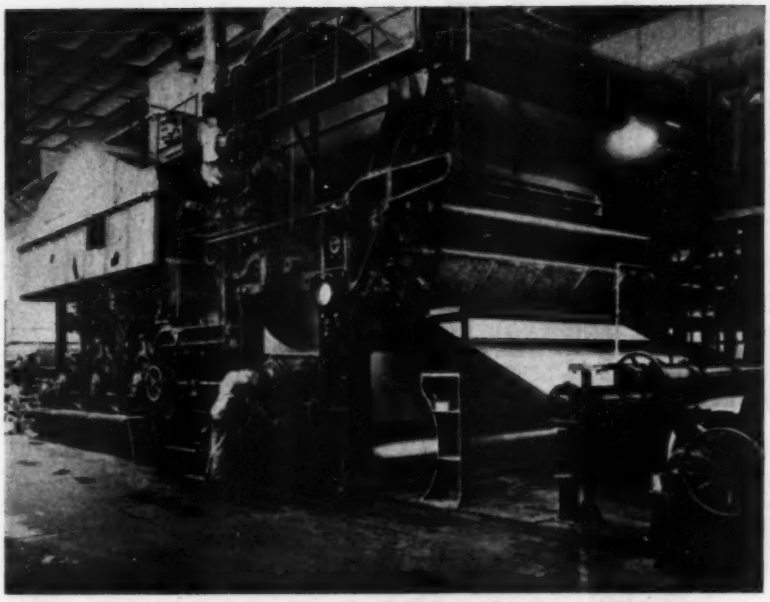
From 1941 until June, 1945, the Boyer mill had produced approximately as much newsprint as was imported, and indeed saved the Australian press from near-extinction during the war. Also, in the postwar dollar shortage, the industry has been of extreme importance to the Australian economy.

Newspapers Consume Annual Output

By the end of 1947, all daily newspapers in Australia were proportionate consumers of the annual output of 31,500 tons—3,500 tons above the rated capacity of the papermaking machine. This machine has a paper width of 162 inches and a speed of 1150 fpm. At this stage, Australia was consuming newsprint at the rate of 180,000 tons a year, but to conserve dollars the Federal Government imposed import restrictions and cut total consumption to 90,000 tons a year from the beginning of 1948. The local contribution of 31,500 tons is obviously vital.

Extensions to the Boyer plant now under way will mean duplication or more than duplication of nearly everything in the mill. For instance, seven extra ring grinders, each with an output nearly twice that of the existing ones, will be installed. The second paper machine will have a paper width of 246 inches. The aim is to increase the total output to 80,000 tons a year by the end of 1950.

To finance these extensions another £A2,500,000 capital had to be raised to add to the existing ordinary capital of £A1,346,191. Australian Newsprint Mills Pty. Ltd., originally floated as a proprietary company was converted to a public company, and the public offered £A1,000,000 of 4½ per cent



M. G. papermaking machine at the Australian Paper Manufacturers plant, Fairfield (Victoria), showing the M. G. drying cylinder

cumulative preference shares. The sum of £A500,000 was provided by the original group of newspapers through a new issue of ordinary shares, and £A1,000,000 was advanced by a financial institution.

Although, broadly, the manufacturing process is the same as West Coast Canadian practice, where large logs are used, there are interesting differences.

To produce satisfactory pulp for newsprint purposes at Boyer, timber has to be ground at higher pressure and with duller grindstones than in Canada.

On the paper machine, the drainage rate of the pulp is abnormally slow, so there had to be special modifications to the forming (or wet) end of the machine.

Growing Conditions Control Fiber Texture

There is another unique feature. Locations and altitudes at which trees grow in Tasmania play a big part in the texture of the fibers. No other newsprint industry in the world has to cope with this problem. So in the receiving yard you will see logs being sorted according to type before being washed and fed to the mill in carefully controlled proportions. The logs are handled in the yard by 100-ton "cat" tractors and gantry cranes. These logs are of great size. Some are 16 ft diam at the butt, and cut from trees 370 years old.

For cutting the logs into flitches, the world's biggest frame saw, with blades 13 ft long, is used. The flitches go to slasher saws which cut them into 4 ft, 8 in "cants," to be fed to the 6-ton grinders, from which they reappear as a steaming porridge-like mass. This stock, 95 per cent water, flows past an agitator where zinc hydrosulphite (approximately 0.5 per cent solution) is added as a brightening reagent. The process is very carefully controlled with dosage varying according to color and proportions of the wood used.

Subsequent processes eliminate oversized lumps of fiber and prepare, clean, and refine the "accepted" stock, which has become diluted to 98½ per cent water. In washing processes, tannic, acetic and other wood acids are drawn off. The stock then passes through big drum filters and waste water flows away, leaving a moist cake of pulp. After further refining, the pulp is kept moving by agitators to prevent the fiber from settling, and is pumped to a proportioner and mixed with a definite percentage of imported sulphite pulp and "broke." The paper finally produced contains about 80 per cent eucalyptus hardwood and about 20 per cent imported softwood sulphite pulp from British Columbia.

From wet stock containing 99½ per cent water the huge paper machine—300 ft long, 17 ft wide, stretching 30 ft above floor level and far down into the basement—turns out rolls of paper containing a standard 8½ per cent moisture. For each ton of paper made, 175.6 tons of water is removed.

The mill employs about 450 people. This does not include about 120 bush workers and 130 people employed on the company's staff housing scheme. Total requirements when expansions are completed will be about 850 in mill and forest.

Associated Pulp and Paper Mills Ltd. employs a total of 785 people including those engaged in building and constructional work.

Although proposals to start the printing and writing paper industry in Australia date back to 1927, it was not until 1936 that the company was floated, with an initial capital of £A2,000,000—£A1,500,000 paid up. Construction started in the beginning of 1937, and the first paper was made on No. 1 paper machine in August, 1938, of imported long-fibered pulp. However, it was not until 1940 that commercial production of paper pulp from Australian hardwoods began at Burnie. Today some grades of paper made by the company are of 100 per cent eucalyptus, and the over-all percentage of imported fiber used is only 5 to 6 per cent.

Annual output by 1946 had reached 20,000 tons, and of this 18,500 tons of pulp was being manufactured by the soda process from eucalypt hardwoods drawn from the forests of northern Tasmania. The other 1,500 tons of pulp, for admixture, was bleached sulphite pulp from North America. During the war, about 75 per cent of the Burnie mill's output was absorbed either by Australian and Allied Services, or Australian Government instrumentalities. Today, practically the whole output is absorbed by the Australian market, and demand exceeds supply.

Wide Range of Quality Papers May Include

Range of paper qualities includes M.F. printing, supercalendered prints, cream laid and wove writings, white bonds, offset printings, drawing cartridge, antique wove and laid, duplicating papers (hard and soft sized), blotting papers, and azure laid account book papers.

Like Australian Newsprint Mills, Associated Pulp and Paper Mills has a big expansion program, with an output of 30,000 tons a year by the end of 1951 as its aim. In addition to the two papermaking machines installed, a third is being installed and a fourth is on order.

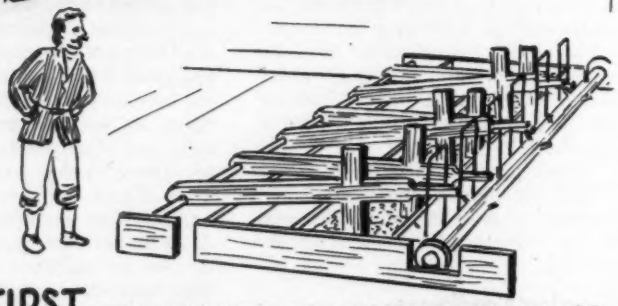
The company is going ahead with plans to manufacture board, and recently a member of the technical staff spent six months in Sweden investigating processes and new equipment.

The company has its own forests, and is installing its own saw mill. The forests are cut on a sustained yield basis, and this involves reforestation and proper forest management.

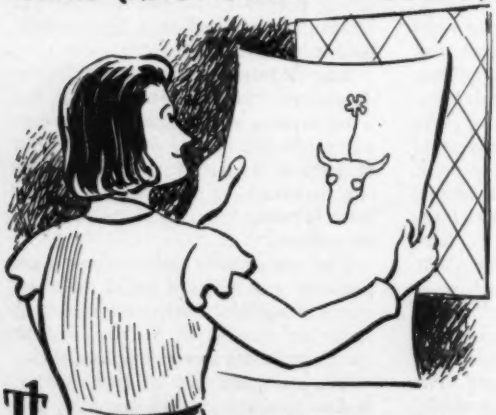
The plant, like that at Boyer, is up to date and highly efficient. A large section of the pulp mill is devoted to the recovery for re-use of raw materials consumed in the pulping process.

PAPER SKETCHES

IN 1807, BRYAN DONKIN OF ENGLAND SOLD BELT-DRIVEN FOURDRINIERS FOR 695 TO 715 POUNDS (ABOUT $3475 TO $3575) AND THE WHEEL-DRIVEN TYPE FOR 750 TO 1040 POUNDS (ABOUT $3750 TO $5200).



FIRST IMPROVEMENT TO BE MADE IN THE STAMPING MILL USED IN THE 1100'S AND 1200'S TO MACERATE PULP, WAS TO EQUIP THE STAMPING RODS WITH NAILS OF GRADUATED SIZE AND TO LINE THE TROUGHS WITH IRON OR BRASS.

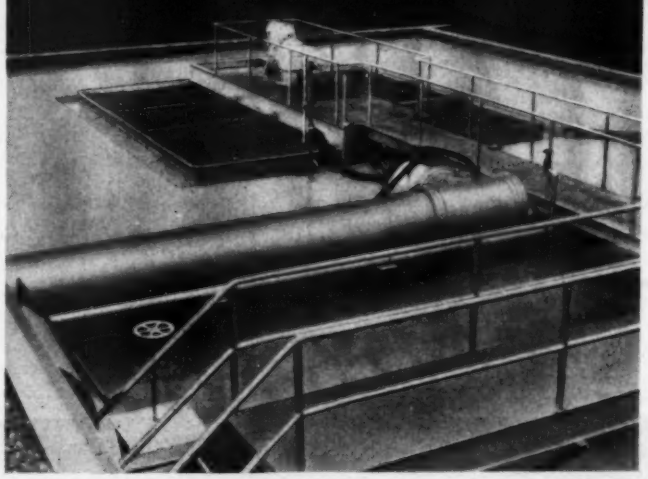


THE EARLY RENAISSANCE PAPERMAKERS OF REGENSBURG, GERMANY, USED WATERMARKS TO DENOTE QUALITY. THE FINEST PAPER WAS MARKED WITH A TOWER; MEDIUM QUALITY, WITH AN OX HEAD; ORDINARY STOCK WITH A HUNTING HORN.

WOOD PULP PAPER, 1/7 THE THICKNESS OF A HUMAN HAIR, IS BEING MADE FOR USE IN CAPACITORS TO INSULATE BETWEEN ALUMINUM FOIL WINDINGS.

PULP AND PAPER MILLS CAN

Save UP TO 80% IN SPACE



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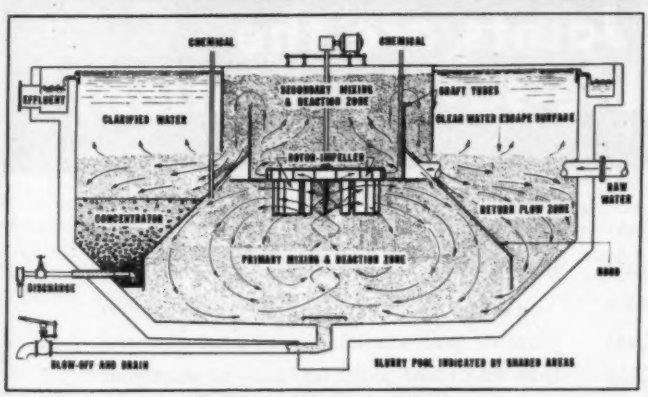
ACCELATOR®

The PREFERRED Water Conditioning Plant!

QUICK mixing, coagulating, settling, sludge removal . . *all* these steps are replaced IN ONE COMPACT UNIT by the ACCELATOR! Savings in space, up to 80%, are possible. Other superior advantages are, 1. Lower construction costs, 2. Simpler operation, 3. Faster chemical reaction, 4. Higher ratings, 5. An *exclusive* slurry recirculation feature which produces better, cleaner water in less time. Over 1100 ACCELATOR installations are now softening or clarifying almost ONE BILLION gallons of water every day! Without obligation discuss your water conditioning problem with our nearest field engineer.

A FEW OF THE MANY ACCELATOR USERS..

Anglaize Box Board Co., St. Marys, Ohio • Brunswick Pulp & Paper Co., Brunswick, Ga. • Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis. • Container Corp. of America, Pencoyd, Pa. • Dexter Sulphite Pulp & Paper Co., Dexter, N. Y. • Downingtown Paper Co., Downingtown, Pa. • Gulf States Paper Co., Tuscaloosa, Ala. • International Paper Co., Livermore Falls, Me. • International Paper Co., Panama City, Fla. • International Paper Co., Georgetown, S. C. • Kimberly-Clark Corp., Kimberly, Wis. • Kimberly-Clark Corp., Niagara Falls, N. Y. • Mead Corporation, Kingsport, Tenn. • National Container Corp., Jacksonville, Fla. • National Container Corp., Ontmagon, Mich. • National Container Corp., Tomahawk, Wis. • North Carolina Pulp Co., Plymouth, N. C. • Northwest Paper Co., Cloquet, Minn. • Rayonier, Inc., Fernandina, Fla. • St. Joe Paper Co., Port St. Joe, Fla. • St. Marys Kraft Corp., St. Marys, Ga. • St. Regis Paper Co., Deferiet, N. Y. • Scott Paper Co., Chester, Pa. • West Jersey Paper Mfg. Co., Camden, N. J. • Weyerhaeuser Timber Co., Longview, Wash. • Weyerhaeuser Timber Co., Springfield, Ore.



THE ACCELATOR

FREE LABORATORY SERVICE . . SEND FOR THIS WATER CONDITIONING ANALYSIS SHEET!

Make sure your water meets the exacting specifications you require. Send for our Water Analysis Sheet, then fill in and return it with a sample. You will receive our laboratory analysis and report promptly. A valuable INFILCO CHEMICAL CALCULATOR slide rule sent FREE to all who return our analysis sheet properly completed. *No cost or obligation is involved for this laboratory service.*

INFILCO

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INFILCO INC.

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WORLD'S LEADING MANUFACTURERS OF WATER CONDITIONING AND WASTE TREATING EQUIPMENT

wherever
pipeline expansion
is a
PROBLEM

CMH Expansion Joints are the cost-saving, trouble-saving solution!

Common expansion joint problems of leakage, repacking, space limitation and complicated, costly installations are solved with CMH Expansion Joints. Compact, inline units, CMH Expansion Joints are easy to install—actually, they are standard piping sections. They require *no* maintenance . . . **and they don't leak.**

CMH Expansion Joints are available in either stainless steel or copper . . . Free-Flexing units for pressures up to 30 psi . . . Controlled-Flexing units for pressures up to 300 psi . . . **special units for unusually high pressures.**

Selection of the correct CMH Expansion Joint has been simplified to a matter of charts from which the joints necessary to meet your requirements may be chosen quickly and easily. CMH'S "Engineered Application Service" is also available to assist on unusual installations.

Full data on CMH Expansion Joints including the charts mentioned above are given in Bulletin EJ-49. Ask for a copy.

CMH—ONE dependable source
for every flexible metal hose requirement
• CMH manufactures all standard types of flexible metal hose, both convoluted and corrugated, in a variety of metals; expansion joints for piping systems; stainless steel and brass bellows; various conduits and special assemblies of these components.

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FLEXON . . . . . identifies CMH products which have served industry for more than 47 years.

Current Comment . . .

The opinions expressed here are from a commentator close to the industry, who, in the past, has interpreted briefly the trends of the paper industry. His comments, which hereafter will appear at greater length than before, and in broader scope, are based entirely on economic and financial facts that emanate regularly from sources that speak with authority.

THE BALLOON STILL FLOATS—BE GLAD IT HASN'T BURST

▶▶▶ A year ago paper manufacturers and industry in general were enjoying the luxuries of the heights of good prices and excessive demand. This year they have been definitely on the downward slope toward the valleys below. All indications are that the downward trend is slowing up and that industry is nearing a median line of reasonable normalcy.

No sane business man could expect last year's prosperity to continue indefinitely, but the pessimists have been prophesying gloom merely because business is not as good as it was last year.

Over all, paper and board production this year are only a reasonable percentage below the peaks of 1948, but in individual groups there has been considerable disparity. Production in April was 85.7 per cent of capacity, and for the year to date 89.9 per cent. The paperboard mills are operating at a lower fraction of capacity.

The best appraisal of the present conditions is that lower sales and earnings are due to more competitive markets, as a result of production having caught up with demand. In the distribution field, consuming and jobbing customers have been living on their inventories partly because of a fear of lower prices. As a result there is a reversal of the conditions of a few months ago when there was large demand by dealers to fill the pipe lines between the mills and the consumers.

Meanwhile, distributors are experiencing the difficulty of small orders and high operating costs; high material, labor and overhead costs, coupled with the small size of the orders being placed may force widespread lay-offs of salesmen and handlers unless the volume of output is stepped up.

The keen competition is causing many mills to give intensive study to their operating methods, and in some cases curtailment is being carried to what appears to be an excess. Some have even reduced their research staffs, and in some cases this already has proved an unprofitable step.

▶▶▶ AT THE CONVENTION of the National Paper Box Manufacturers Association in New York, a sales decline of 12 to 14 per cent for 1949 as compared with 1948 was indicated; the manufacturers were advised to show less pessimism and to work harder to overcome the poor showing of the first quarter of this year. They were urged to develop new business by introducing new ideas to their customers.

▶▶▶ AN IMPORTANT FACTOR in the future conditions in the paper industry is the prospect that there may be a revaluation of foreign currencies, beginning with a devaluation of the pound sterling. If this takes place, the other European nations doubtless will adjust their currencies to the sterling base. In times past this has meant lowered prices for Scandinavian pulp with the resultant impact on domestic producers, inasmuch as such currency devaluation is equivalent to a reduction of United States tariff rates—at least in effect. A devaluation of 10 per cent in foreign currency is equal to a cut in United States tariff rates of 10 per cent, which in many grades is equivalent to placing the foreign material on the free list, or even to the equivalent of a bonus for the sale of duty-free pulp.

▶▶▶ DEVELOPMENTS IN Washington are definitely in the direction of less governmental control and expenditures than the Truman Administration had demanded, and this should be a bullish element in forecasting the future. It now seems assured that the demand for medical legislation and attendant additional taxation is dead for this session of Congress. All that likely will be acted upon of the entire list of Administration requests are the Atlantic pact, the trade agreement program and the Taft-Hartley labor bill. Of these, only the Atlantic pact treaty is certain to be approved.

▶▶▶ LEGISLATION under way in the Senate and the House of Representatives looks toward better protection of the forests of the nation, both public and private, but it is significant that underneath it all there is recognition of the progressive manner in which the paper companies have developed highly scientific programs of forest preservation.

▼

FINANCIAL

▶▶▶ CREEPING PARALYSIS evidenced in the securities markets during May has been followed by an orderly but material drop in the price of paper mill stocks, both common and preferred. Almost without exception the current prices are below those of April.

A.P.W. Products Company—Net loss in the first quarter of 1949 was $29,714 as compared with a profit of $83,238 a year ago.

American Writing Paper Company—Net loss for the first quarter of 1949 was $14,242 as compared with a loss of $15,656 a year ago.

Certain-teed Products Corporation—Net income for the first quarter of 1949 was $831,056 as compared with $1,549,243 in the same quarter of 1948.

Clopay Corporation—Net income for the first quarter of 1949 was $255,013 as compared with $366,393 a year ago.

Dixie Cup Company—Net profit for fiscal year ended March 31 was $1,760,683 as compared with $1,474,535 for the previous year.

Eastern Corporation—Net profit for the quarter ended March 31 was $55,482 as compared with $622,477 for the same quarter a year ago.

Gaylord Container Corporation—Net income for the first quarter of 1949 was $1,250,158 as compared with $2,087,689 in the same quarter of 1948.

Great Northern Paper Company—Net income for the first three months of 1949 was $1,352,347 as compared with $868,899 in the same quarter of 1948.

Hammermill Paper Company—Net income for the first quarter of 1949 was $214,102.

Hinde & Dauch Paper Company—Net profit for the first quarter of 1949 was $860,665 as compared with $1,163,029 a year ago.

International Paper Company—Net profit for the first quarter of 1949 was $13,814,831 as compared with $13,313,408 in the same quarter of 1948.

Kimberly-Clark Corporation—Net income for the first quarter of 1949 was $1,534,641 as compared with $1,822,453 a year ago.

Marathon Corporation—Net income for six months ended April 30 was $2,324,920 as compared with $2,782,896 in the same period a year ago.

Mead Corporation—Net income for twelve weeks to March 20 was $835,345 as compared with $1,012,499 for the comparable period a year ago.

National Container Corporation—Net income for the first quarter of 1949 was $585,325 as compared with $1,830,584 for the same quarter in 1948.

Nekoosa-Edwards Paper Company—Net income for the quarter ended March 31 was $195,307 as compared with $653,169 a year ago.

Oxford Paper Company—Net income for

the first quarter of 1949 was $366,368 as compared with $365,497 a year ago.

Puget Sound Pulp & Timber Company—Net income for the first quarter of 1949 was $506,433 as compared with $1,592,624 a year ago.

Rayonier, Inc.—Net profit for the first quarter was $2,016,422 as compared with $2,460,679 in 1948.

Scott Paper Company—Net income for the first quarter of 1949 was $1,176,607 as compared with $719,441 for the same quarter of 1948.

Sorg Paper Company—Net income for the March quarter was $39,044 as compared with $309,729 a year ago.

Southern Advance Bag & Paper Company—Net income for 1948 was $3,920,763 as compared with $3,584,509 in 1947.

Union Bag & Paper Company—Net income for the first quarter of 1949 was $2,166,736 as compared with $3,652,155 in the same quarter of 1948.

West Virginia Pulp and Paper Company—Net profit for six months ended April 30 was $4,753,094 as compared with $5,130,776 for the comparable period a year ago.

Paper Mill Corporate Changes

National Container Corporation—A new issue of $6,000,000 in 4 per cent notes payable in 1964 has been placed with the Metropolitan Life Insurance Company to provide additional working capital.

Potsdam Paper Mill—As a result of a series of bankruptcy proceedings, the property of the Potsdam Paper Mill will be returned to the Reading Corrugated Company, which had leased the property to the Potsdam company.

St. Regis Paper Company—A merger of Taggart Corporation into the original St. Regis Paper Company will be voted upon at the coming annual meeting. While most of Taggart stock is already held by St. Regis, other holders will be paid $11 per share for their stock.

Scott Paper Company—An issue of 45,000 cumulative preferred shares will be underwritten by a group of New York investment bankers. The offering price and dividend rate will be announced later. The present preferred is currently selling at about 95.

New York Stock Exchange—Stocks

	Closing Prices May 25	April 25
A.P.W. Products	*2⅜-2⅞	*3¼-3⅝
Celotex	18¼	19½
Same Preferred	*16⅞-17½	*17⅛-17½
Certain-teed Products	10⅝	11¼
Champion P & F Co.	20¾	21½
Same Preferred	93	*94½-95
Chesapeake Corp.	18½	*19⅜-20¾
Container Corp.	33	33⅞
Same Preferred	*95½-96	*96-97⅝
Continental Diamond	7	8⅛
Crown Zellerbach	22⅝	23⅝
Same Preferred	97½	97½
Same $4 Preferred	*90-91	*94-95
Dixie Vortex	26	*28¼-29
Same "A"	50	*51-52
Eastern Corp.	9¼	*11-11⅝
Robert Gair	5⅝	6
Same Preferred	*15⅝-16	*16-16¼
Gaylord Container	17½	18½
International Paper	46⅛	48⅛
Same Preferred	95⅝	*96¼-97⅛
Kimberly-Clark	19	19⅝
Same Preferred	96⅜	99⅝
McAndrews & Forbes	*31½-32	*31⅝-32½
Marathon	19⅝	*19⅝-20
Masonite	44	43¾
Mead Corp.	14	*15⅝-15⅞
Same Preferred	70½	73⅛
Same 2nd Preferred	*29⅝-31¾	*31-31½
National Container	5¼	7
Paraffine Co.	17¾	17⅞
Same Preferred	*103-104¼	*104-105⅜
Rayonier	22⅜	23¼
Same Preferred	30	31½
Scott Paper	*52⅜-54	*50¼-50½
Same Preferred	*94¾-90	*93¾-95½
St. Regis	6⅞	7⅝
Same Preferred	*84-84½	86
Sutherland Paper	33½	*32⅝-33
Union Bag & Paper	24⅛	25⅝
United Bd & Carton	5⅛	*5⅛-5⅜
United Wall Paper	*3¼-3¾	3⅜
Same Preferred	*22-23	—
U.S. Gypsum	90½	97½
Same Preferred	181½	*181⅜-183½
West Va P & P Co.	36⅛	36½
Same Preferred	105½	*105-106

New York Stock Exchange—Bonds

A.P.W. Products 3%	84⅜	—
Celotex 3½%	101	—
Champion P & F Co. 3%	101	—
Mead Corp. 3%	100½	—

New York Curb Exchange—Stocks

Am Writing	*5⅜-5⅝	*5⅜-6
Great Northern	34⅜	*34½-35¼
Taggart	*10⅝-11¼	*10⅝-11⅝

*Closing Bid and Asked Prices

Safety . . .

INDUSTRIES CO-OPERATE IN SIGHT-SAVING PROGRAMS

Over 2,000,000 workers—10 per cent of the nation's industrial workers—are now receiving the benefits of new industrial programs installed by leading manufacturing plants to improve the safety and sight of their employees. The adoption of recently conceived industrial safety and visual efficiency programs has resulted in reduced eye and other accidents, and the saving of many thousands of dollars in medical and compensation costs.

As explained by W. T. Cameron of the American Optical Company, primarily this plan provides means for checking industrial vision. A portable sight-screening instrument which can be utilized anywhere in a plant to check fourteen important visual functions in a few minutes has been developed.

If the professional evaluation of the check indicates need for visual care, the employees are advised by their companies to seek professional advice; and, in addition, those workers in eye-hazardous jobs are provided with safety goggles to protect their eyes, and, if their vision is deficient, with prescription safety goggles.

Other features of the program include establishment of eye protection standards, a program for fitting and maintaining eye protection devices, and recommendations for the improvement of environmental conditions affecting vision, such as correct illumination, elimination of glare, and other means for increasing visual perception.

The safety manager of the International Business Machines Corporation, Endicott, New York, reported that, "There has been no loss of vision through accidents in our plants since putting the program into effect. Dozens of safety lenses shattered by severe impacts indicate that serious eye injuries were avoided. All injuries, including minor cases, have been reduced approximately 80 per cent."

Some of the firms using the program are: Longview Fibre Company, Strathmore Paper Company, Consolidated Water Power and Paper Company Monsanto Chemical Company, and Owens-Illinois Glass Company.

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SAFETY CONTEST SCORES

▶▶▶ PARTICIPANTS in the paper industry safety contest have reported for the tenth month—April. Of the entrants having the required number of man-hours, 22 mills maintain a perfect record. The average injury rate for all reporting plants in April was 10.44, slightly higher than the March rate of 9.99; however, it was better than the nine-month cumulative rate of 11.45. The better-than-average rate in April shaded the cumulative rate to 11.43 at the end of ten months.

Division I—Paper and Pulp Mills

Group A (None)

Group B (None)

Group C

Spaulding Fibre Co., Inc., North Rochester, N.H.

Certain-teed Products Corp., York, Pa.

Group D

Hollingsworth & Whitney Co., Madison, Me.

Container Corp. of America, Carthage, Ind.

Armstrong Cork Co., Pensacola, Fla.

Certain-teed Products, Richmond, Calif.

Mead Corp., (Wheelwright Div.), North Leominster, Mass.

Marathon Corp., Ashland, Wis.

Strathmore Paper Co., (Mill No. 1), Woronoco, Mass.

American Writing Paper Corp., (Albion Div.), Holyoke, Mass.

Fort Wayne Corrugated Paper Co., Vincennes, Ind.

National Gypsum Co., Newburgh, N.Y.

Division II—Paper and Board Remanufacturing

Group A (None)

Group B

Canadian Cellucotton Products Co., Ltd., Niagara Falls, Ont., Canada.

Group C

Kimberly-Clark Corp., Appleton, Wis.

Marinette Paper Co., S. Glens Falls, N.Y.

Gaylord Container Corp., Tampa, Fla.

Pillsbury Mills, Inc., Wellsburg, West Va.

Thilmany Pulp & Paper Co., (Bag Mill), Kaukauna, Wis.

Certain-teed Products, Buffalo, N.Y.

Flintkote Co., Hollywood, Calif.

ABC Corrugated Box Co., Minneapolis, Minn.

Bay West Paper Co., Green Bay, Wis.

Never omit the "Composite Valve"

— in any cost-wise planning

CALL IT THE "COMPOSITE VALVE"—the giant that would result if *all* the valves in a plant were *one* valve. As pictured here, its proportion to other equipment in this detailed model of an automobile factory is fairly accurate. Representing your total valve investment, its size may surprise you, but it must be considered in any plan for economical plant operation.

IT PAYS to keep *your* "composite valve" in mind at all times . . . and thus avoid the common error of dismissing valves as a comparatively unimportant investment. With wages and material costs the highest ever, your total valve expense warrants the same careful attention that you give to operating costs of larger plant units.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets. JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering for lowest valve costs in the long run. Sold through leading Industrial Distributors.

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

"PRACTICAL PIPING LAYOUTS" is a 32-page book containing diagrams and descriptions of 25 basic piping layouts with complete recommendations for valve selection and location in the lines. Tells you "which valve where for best performance". FREE on request. Write JENKINS BROS., 80 White Street, New York 13, N. Y.

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SINCE 1864

JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

IMPROVE YOUR EMPLOYEE RELATIONS WITH THIS FIVE-STEP PROGRAM!

Of the nation's 38,000 companies employing 100 or more people, over 20,000 firms are operating the Payroll Savings Plan—the popular system by which employees invest in U. S. Savings Bonds every payday. These companies report *internal benefits* from the Plan: reduced absenteeism, lower accident rate, increased production. Such results are, of course, manifestations of the sense of greater security the employees feel as their investment in Bonds grows. It naturally follows that employee-employer relations improve as well.

HOW TO GET THE MOST GOOD

Obviously each company benefits in proportion to the percentage of its employees who participate in the Plan. Nation-wide experience indicates that 50% of the employees in your company can be persuaded to participate *without high-pressure selling*. Here are five steps which have proved to be the "magic formula" for putting over the Plan. They will get results for you:

1. See that a top management man sponsors the Plan.

2. Secure the help of your employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.

4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

EVERYBODY BENEFITS!

7,500,000 workers are regularly buying an individual average of $20 of Savings Bonds per month. These people are gaining financial security—are putting more opportunity into their futures—because at maturity every $3 invested will pay $4.

Business and the national economy benefit too. Savings Bond dollars are deferred purchasing power—an assurance of good business during the years to come.

Check up on the Payroll Savings Plan in your company. If fewer than half of your employees are participating, you have a lot to gain by following the five-step program outlined here. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division. While it's on your mind, why not call him right now? Or write the Treasury Department, Washington 25, D. C.

The Treasury Department acknowledges with appreciation the publication of this message by

THE PAPER INDUSTRY AND PAPER WORLD

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and the Advertising Council.

Associations

Niagara Branch Host to Summer Meeting Canadian Tech. Section

▶▶▶ THE SUMMER MEETING of the Technical Section of the Canadian Pulp and Paper Association was held at the General Brock Hotel, Niagara Falls, Ontario, June 1-3.

The Niagara Branch of the Technical Section was host to the conference; John Buss, Section chairman for 1949, presided.

The morning of the first day, three interesting papers were presented:

"Electrical Evaporation of Waste Sulphite Liquor," by L. R. Beath, assistant research director, and Dr. H. S. Hill, research director, both of Price Brothers and Company Limited, Kenogami, Quebec.

This paper described a process, developed in a pilot plant, which evaporates waste sulphite liquor down to a solid, usable as fuel. This research program is carried out in line with general industry-wide research to reduce waste and to utilize former waste material.

"Industrial Electronics," by G. R. Mounce, Electronic Associates Limited, Toronto, Ontario.

"The Papric Dirt Counter" (Papric shortened from Pulp and Paper Research Institute of Canada), by S. M. Chapman, Pulp and Paper Research Institute of Canada. This paper described a new device to count dirt in pulp and paper. The device, made in the Institute, is slated to be placed on the market soon.

Afternoon group discussions took up subjects of special interest to the industry. One subject, Alkaline Pulping, was covered in a discussion of Alkali Room Practice, and was based on replies to a questionnaire. George Wilson, Consolidated Paper Corporation Ltd., spoke on the subject "Operation of the New Lime Kiln at the Company's Three Rivers Plant."

Two lectures on fine papers were featured: "Nomographic Assistance in Statistical Calculations," by W. E. Pattee, of the E. B. Eddy Company, Hull, Quebec; and "Report of a Mill Scale Investigation of Centrifugal Dirt Removal Equipment," by W. C. R. Jones, Howard Smith Paper Mills Ltd., Cornwall, Ontario. The latter report covered the findings of concentrated efforts to improve paper quality.

The second day of the conference was devoted entirely to mill visits. Seven Canadian mills and three USA mills, all in the Niagara district, sent special invitations to the delegates.

Last Day of Meeting Devoted to Group Discussion

The program of the last day of the conference was given over to papers and group discussions. The agenda included the following subjects:

Board—(a) Drying of Paperboard, a discussion of replies to questionnaire; (b) Causes and Cure of Ply Separation of Paperboard.

Mechanical Pulping — Operating problems in the manufacture of mechanical pulp. The questions received from mills formed the basis of this discussion.

Newsprint—Operating problems in the manufacture of newsprint — also based on mill questions.

John Buss, chairman of the Technical Section of Canadian Paper and Pulp Association

Sulphite—Cause and elimination of scaling and liming in sulphite mill equipment.

Board—(a) Relation between surface oil resistance of paperboard and printability; (b) Extraneous surface material which affects the printability of paperboard.

Fine Papers—Operating problems in the manufacture of fine papers.

Fundamental Research—Some recent research on lignin and waste liquor. (a) "Mild Oxidation of Alkali Lignin," paper by Drs. R. A. V. Raff and G. H. Tomlinson II, both of Howard Smith Paper Mills Ltd.; (b) "The Fractionation of Waste Sulphite Liquor," by Dr. F. H. Yorston, Pulp and Paper Research Institute of Canada.

Engineering—Heat and Power

Three papers were given on the subjects of engineering, heat and power: "A New Method of Unloading Pulpwood from Box Cars," A. D. Hamilton, The Ontario Paper Company Ltd.

"Flash Drying of Bark at Great Lakes," W. G. Tamblyn, assistant engineer, Great Lakes Paper Company Ltd., Fort William, Ontario. The process discussed in this paper took two years to develop. It was brought out that in order to utilize the bark (thus utilizing the whole log) the problem was tackled by reducing the moisture content of the bark.

"Applications of Gas Burners for Increased Drying Capacity," by G. R. Van Kampen, Red-Ray Manufacturing Company, New York.

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WESTERN SOC. ENGINEERS COMPLETES 80TH YEAR BY DEDICATING NEW QUARTERS

The 80th anniversary of the Western Society of Engineers was commemorated by the dedication of its new headquarters at 84 East Randolph Street, Chicago.

This event marked the establishment of an engineering and science center for Chicago in conjunction with the John Crerar Library. The Society's new center occupies three floors of the Library building. It is equipped with the most modern facilities including an auditorium with public address and picture projection systems to accommodate 300 persons. There are lounges and a dining room.

The Western Society of Engineers has a membership of about 2,500, representing all fields of engineering. Gustav Egloff, petroleum technologist and director of research for the Universal Oil Products Company, Chicago, was elected to the presidency at the annual election.

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▶▶▶ "YOUR CONSULTANT," an 8½ x 11, four-page offset bulletin to be published six times a year, has been launched by the Association of Consulting Chemists & Chemical Engineers, Inc., 50 East 41st Street, New York, New York. The first issue, dated May, 1949, contained advertising from chemists and chemical engineers in sizes from 1⅝ inches to 3¼ inches. The editorial matter is handled, as the editor says, in a "newsy, quickly-read gazette style," and consists chiefly of reports on the activities of its members in and around New York and Washington.

Speakers table at the NW Division of Superintendents Association: Left to right—C. J. McMahon, L. S. Sabatke, Tom Gillespie, F. X. Kreiling, Mrs. William Powell, and William Powell

Spring Meeting of Northwestern Div. Superintendents Association

▶▶▶ THE NORTHWESTERN Division of the Superintendents Association held its spring meeting May 13 and 14 in Appleton, Wisconsin. Registration totaled about 200 persons.

The first day of the two-day session was given over to registration and recreation, and the more technical aspects of the meeting were confined to the sessions of the second day.

At the morning session, A. M. Schmalz, of the Thilmany Pulp and Paper Company, Kaukauna, Wisconsin, spoke on "Papermaking in a Specialty Mill"; and Jesse M. Holderby, coordinator, Sulphite Pulp Manufacturers Research League, Inc., and general manager, Lake States Yeast Corporation, presented a formal paper entitled "Primer on Stream Pollution."

Mr. Schmalz said that Thilmany, as a specialty mill, had to gear its operations to handle orders that ranged from the very small to the very large. To take care of the fiber requirements of the paper grades produced, he said, Thilmany keeps 30 different grades of pulp on hand at all times. He also touched upon color, pointing out that it was a most important problem of a specialty mill, that in the old days a commercial match was good enough, but that nothing but a perfect match would be acceptable today. The color card file at Thilmany, he added, covers 286 different shades and that at times even that file doesn't include a color that has been ordered.

In his paper on stream pollution Mr. Holderby made reference to the tidal wave of antipollution agitation, which has shown itself during the past year from Maine to Florida and from the East Coast to the West Coast, and stressed the fact that it is necessary to understand what pollution is before intelligent efforts can be made to control it. Mr. Holderby later covered the three basic types of pollution, organic, inorganic, and bacterial; and then cited and discussed four general sources from which pollutants originate—nature, domestic activity, industrial activity, and agricultural activity.

In concluding his remarks, Mr. Holderby appealed for a rational, realistic aproach to stream sanitation, stating that such an approach, which recognizes the rule of the greatest good for the greatest number, will further the cause of clean streams much more effectively than any uncompromising emotional demand for pristine purity ever could.

"Social and Economic Significance of Atomic Energy" was the subject of the luncheon address given by J. T. Wilson, chief physicist of Allis-Chalmers Manufacturing Company, Milwaukee, and the guest speaker.

The afternoon program was devoted to a general session on power and maintenance. E. P. Gleason, manager of power, Nekoosa-Edwards Paper Company, served as its chairman. Four subjects were presented for discussion, and for each there was a leader as well as a commentator:

Coal, Eastern vs Western in Wisconsin. Leader—T. F. McCarthy, coal consultant (formerly War Production Board State Coal Co-ordinator); Commentator—Grover Keeth, chief engineer, Marathon Corporation.

Briner Economizers in Paper Mills. Leader—F. H. Coldwell, assistant manager of power, Nekoosa-Edwards Paper Company; Commentator—A. E. Montgomery, J. O. Ross Engineering Corporation.

Paper Machine Drives. Leader—W. E. Waymire, Westinghouse Electric Corporation; Commentator—W. M. McGraw, General Electric Company.

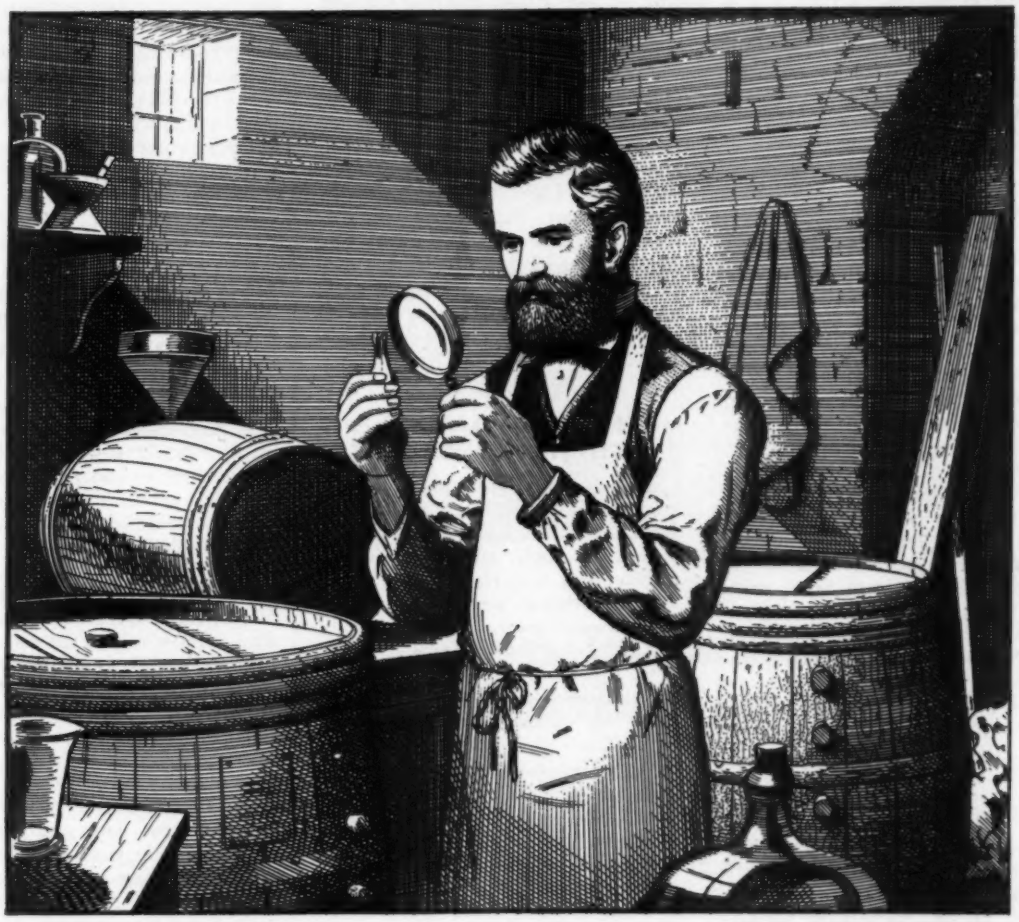
Automatic Control in Paper Industry. Leader—Milton A. Schreiner, The Foxboro Company; Commentator—Harry Gochnauer, chief engineer, Northern Paper Mills.

A trap shoot and a dinner dance concluded the meeting.

Officers of the Northwestern Division are: Chairman, F. X. Kreiling, Thilmany Pulp and Paper Company; First Vice Chairman, L. S. Sabatke, Marathon Corporation; Second Vice Chairman, Mace Harris, The Northwest Paper Company; and Secretary-Treasurer, Paul West, Thilmany Pulp and Paper Company.

J. M. Holderby delivering paper on "Primer on Stream Pollution" at the NW Div. of the Superintendents Association

Milton A. Schreiner, The Foxboro Co., served as leader of discussion on "Automatic Control in Paper Industry"



The Idea that Revolutionized Papermaking

In 1860 paper was still made almost exclusively from rags. The feverish search for a substitute went on. Then, in 1865 there flashed into the mind of Benjamin C. Tilghman, a Philadelphia chemist, an idea that was to revolutionize papermaking the world over. While experimenting in his laboratory, he noted that sulphurous acid attacked the wood in his barrels and vats, breaking down and softening the wood fiber. Others before him had observed this, but Tilghman saw what a chemical method of softening wood into pulp might mean to the paper industry.

In a small mill at Manayunk, Pennsylvania, he put his theory to practice, proved its success and was granted the first United States patent for manufacturing wood pulp by the sulphite process. Thus Tilghman became a pioneer in producing paper from wood, helped spur the growth of America's pulp and paper industry.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

F. C. HUYCK & SONS · *Kenwood Mills* · RENSSELAER, N. Y.

KENWOOD WOOL PRODUCTS

HUYCK *Felts*

MERIT AWARD PRESENTED TO SUPTS. ASSOCIATION

An Award of Merit for its accomplishments during 1948 was presented to The American Pulp and Paper Mill Superintendents Association by the American Trade Association Executives, Washington, D.C., on April 30. This is an international society of professional trade association executives.

The presentation was made at a luncheon in Washington by H. B. McCoy, representing the Honorable Charles Sawyer, U. S. Secretary of Commerce. Mr. McCoy, who also gave the awarding speech at the luncheon, is Director of the Office of Domestic Commerce. In the absence of George W. Craigie, secretary-treasurer of the Superintendents Association, the award was received by J. H. O'Connell, a past president of the Association and now a consultant in the paper industry.

The Honorable Mr. Sawyer was chairman of the jury of awards. With him on the jury were Earle O. Shreve, president, Chamber of Commerce of the United States; Morris Sayre, president, National Association of Manufacturers; Dr. L. J. Buchan, past president, National Association of Deans of Schools of Commerce; and Dr. John Stempel, president, American Association of Accedited Schools of Journalism.

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▶▶▶ THE MICHIGAN Division of The American Pulp and Paper Mill Superintendents Association, Inc., will hold its annual sports and field day on July 26 at the Kalamazoo Country Club, Kalamazoo, Michigan, starting at 1 p.m. For those persons who do not golf, there will be croquet, lawn dice, a putting contest, etc. A business session for the purpose of electing officers for the year 1949-1950 will be held following the buffet dinner at 7:30 p.m. The committee in charge of the affair consists of William A. Honey, Stowe-Woodward, Inc., chairman; F. R. Hamilton, Allied Paper Mills; and John Vanderberg, of R. T. Vanderbilt Company.

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NEW OFFICERS ELECTED BY OHIO SECTION OF TAPPI

At the annual meeting of the Ohio Section of TAPPI, officers were elected to serve for 1949-1950. The meeting was held at the Hotel Manchester in Middletown, Ohio, April 21—members of the Miami Valley Division of the Superintendents Association were guests of the TAPPI Ohio Section.

New officers and executive committee members elected were:

Chairman—Arthur Thurn, Champion Paper & Fibre Co., Hamilton

Vice Chairman—Don J. Goodman, Sorg Paper Co., Middletown

Recording Secretary—Earl Knapp, Weston Mfg. Co., Dayton

Corres. Secretary—John L. Clouse, Oxford-Miami Paper Co., West Carrollton

Treasurer—R. D. McCarron, Stein, Hall Co., Inc., Cincinnati

Executive Committee—Phil S. Cade, Harding-Jones Paper Co., Middletown; Carl Roess, Wrenn Paper Co., Middletown; D. M. Yost, Sorg Paper Co., Middletown; E. C. Hendrickson, The Mead Corp., Chillicothe; C. E. Brandon, Aetna Paper Co., Dayton.

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MICH. DIVISION LADIES NIGHT HIGHLY SUCCESSFUL

Reported to be the largest affair ever held by the Michigan Division of the Superintendents Association, the annual ladies night and dinner dance, held on May 7, at Hotel Harris, Kalamazoo, Michigan, was attended by 178 members and guests.

Toastmaster for the occasion was A. Wm. Riedel, president Gus Riedel & Sons, Kalamazoo brush manufacturing firm. His introductions included the local officers and committee members of the Michigan Division, and two past presidents of the national association—E.T.A. Coughlin and Raymond L. Barton. Glen Sutton, of Sutherland Paper Company and fourth vice president of the national organization, read a telegram from Ollie W. Messner, president of the national association, who was unable to attend.

Preceding the dinner, a cocktail party was held in the Green Room of the hotel. This part of the festivities was sponsored by a large group of firms representing the allied industries.

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FIRST SHOW OF ITS KIND

The first Plant Maintenance Show and Exposition devoted exclusively to cost reduction through improved installation, operation, and maintenance of equipment and services in factories, warehouses and other plants will be held in the Auditorium, Cleveland, Ohio, January 16-19, 1950. Concurrently with the show, a four-day conference on plant maintenance methods will be held with L. C. Morrow, editor, *Factory Management and Maintenance*, as general chairman.

There will be no charge for either exhibit or conference attendance.

Exhibits and conference subjects will cover air conditioning, heating and ventilating; buildings, building materials and services; electrical equipment; employee relations, training and safety; instruments and meters; lubricants and lubricating equipment; maintenance tools and supplies; management consultation services; materials handling methods and equipment; mechanical rubber goods, including belts, hose and packing; paints, painting equipment and product finishes; power generation and distribution; power transmission, and welding and gas cutting.

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FIRST JOINT MEETING OF CANADIAN ASS'N AND PAC. DIV. OF SUPERINTENDENTS

The meeting of the Pacific Coast Division of The American Pulp and Paper Mill Superintendents Association and of the Pacific Coast Branch of the Canadian Pulp and Paper Association held May 21 in Victoria, British Columbia, Canada, was the first of its kind ever held in the West.

Paul E. Cooper, president and general manager of Pacific Mills, Ltd., Vancouver, British Columbia, one of the speakers, urged the establishment of provincial "tree farms" similar to those in Washington state. He advised an outright ownership of British Columbia forest lands by industry, to be operated on a "crop" basis. "Washington and Oregon are at least five years ahead of British Columbia in assuring those states and their people of a perpetual yield of timber and a permanent forest industry," he said.

Commenting on the future of the pulp and paper industry, Mr. Cooper reviewed the transition from a seller's to a buyer's market. "The industry can look forward to the immediate future with some degree of speculation. . . . Therefore, the ancient art of salesmanship is becoming more essential," he said.

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TINKER ADDRESSES MIAMI VALLEY SUPTS. ASSOCIATION

The Miami Valley Division of the Superintendents Association held its spring meeting at Piqua, Ohio, May 6, where the group was the guest of The Orr Felt & Blanket Company.

Following a full day of activities, including a trip through the Orr plant, the meeting was called to order, and Orr's new president, M. B. Orr, welcomed the association in behalf of his company.

William Beckett of the Beckett Paper Company, Hamilton, Ohio, served as master of ceremonies and introduced the speaker of the evening, E. W. Tinker, executive secretary of the American Paper and Pulp Association.

Mr. Tinker emphasized the objective of the paper industry, which is stability and permanence. He deplored the agitation in some quarters to reduce the tariff on incoming papers by 25 per cent, pointing out that, as in the case of the low rate on watches, the paper industry would be very greatly weakened because Canada and Scandanavia soon would be shipping in paper instead of pulp. The contemplated increase in postage would, he said, also work to the injury of the paper industry, as would a flat freight rate like that applying to cement shipments.

Mr. Tinker also touched on the recent series of sanitary tests made on board to determine its suitability for use in contact with food products. No injurious bacteria was found.

Referring back to the subject of stability and permanence, some 20 million acres of forest have been bought by the paper companies, very pointed evidence that paper is fast attaining a position of stability and permanence, and that the supply of pulp will remain adequate.

The meeting concluded with the presentation of prizes to the day's golfers, and a clever display of the magician's art by George Witham of the Orr company.

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COMING EVENTS

July 26—Supt. Ass'n, Michigan Div., Annual Sports and Field Day, Kalamazoo Country Club, Kalamazoo, Mich.

Sept. 8-10—Supt. Ass'n, N. Y.-Canadian Div., Champlain Hotel, Bluff Point, Plattsburgh, N. Y.

Sept. 12-15—TAPPI (National) General Fall Meeting, Multnomah Hotel, Portland, Ore.

Sept. 16—Conference of Northeastern Wood Utilization Council on Wallboards will be held in Cambridge, Mass., with the co-operation of Harvard University. Attendance limited to 75. Obtain invitations by writing E. L. Heermance, Sec., Northeastern Wood Utilization Council, New Haven 6, Conn.

Sept. 26-29—National Paper Trade Ass'n, Fall Meeting, Stevens Hotel, Chicago.

Oct. 4-7—Society of Industrial Packaging and Materials Handling Engineers, Fourth Annual Exposition, Convention Hall, Detroit, Mich.

Oct. 14-15—Supt. Ass'n, Southeastern Div., Hotel Roanoke, Roanoke, Virginia.

Oct. 24-26—Supt. Ass'n, Southern Div., Fall Meeting, Frances Hotel, Monroe, La.

Oct. 25-28—National Safety Council, 1949 National Safety Congress, Chicago.

Oct. 31-Nov. 3—TAPPI, Engineers Conference, Statler Hotel, Boston, Mass.

Nov. 1-5—Pacific Chemical Exposition, California Section, American Chemical Society, Civic Auditorium, San Francisco, California.

Jan. 16-19—First Plant Maintenance Show, Auditorium, Cleveland, O.

Looking for a valve that *won't leak*

even in severe corrosive services?

Everyone who has experienced valve leakage either internal or external, knows what a headache it can be. For a wide variety of services involving corrosive and hard-to-handle fluids, Hills-McCanna Diaphragm Valves will put an end to those problems. These valves operate like a simple pinch clamp. A resilient rubber or synthetic diaphragm clamped between the bonnet and body is squeezed down against a wier by a compressor to shut off the flow. The resiliency of the diaphragm permits it to be molded to and around the edges of the weir to make a completely leaktight closure.

The diaphragm also serves as a seal to prevent external leakage and makes it impossible for the material handled to be contaminated or for the material to get into the working parts. You can't beat it for simplicity and effectiveness.

Hills-McCanna Diaphragm Valves are made in standard sizes ⅜" through 14". Available with rubber, glass or specially lined bodies or with cast iron, alloy, Haveg or stone ware bodies. Choice of manual, remote or automatic controls. Write for data sheets. HILLS-McCANNA CO., 2433 W. Nelson St., Chicago 18, Illinois.

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Also manufacturers of — Proportioning Pumps
Force-Feed Lubricators • Magnesium Alloy Castings

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AMER. CYANAMID HOLDS MEETING FOR MIDWESTERN SALES AND TECH. REPR.

A general sales meeting was held by The American Cyanamid Company (New York) in Kalamazoo, Michigan, on May 24 and 25 for its Industrial Chemicals Division and its Plastics and Resins Division. All midwestern sales and technical representatives for the two divisions involved were in attendance, along with division and department heads from the company's New York office.

The meetings were devoted to discussions of new and old products marketed by the two divisions, market studies of the midwestern territories and an interchange of information between department heads, technical personnel, and men in the field who are in actual contact with customers.

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ACQUISITION OF PROPERTY PART OF NEW PROGRAM OF D. J. MURRAY MFG. CO.

Plans for the future and the necessary expansion have caused the D. J. Murray Manufacturing Company, Wausau, Wisconsin, to acquire property adjacent to its present plant, which gives the company possession of the entire area along the railroad right-of-way. A large part of the company's plan to improve its facilities and extend markets includes pulp and paper mill equipment.

At the annual meeting of stockholders, all officers of the company were re-elected. The slate is headed by F. C. Boyce, president. M. P. McCullough is vice president; C. E. Staky, executive vice president and general manager; George L. Ruder is treasurer, and A. W. Plier is secretary and assistant manager.

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ESGATE NOW ASSOCIATED WITH THEW SHOVEL CO.

The appointment of E. E. Esgate as assistant to the general manager of The Thew Shovel Company, Lorain, Ohio, was recently announced. Mr. Esgate, well known in the construction, logging and pulp and paper industries as a consulting engineer, will work under the direct supervision of the general manager.

Since June, 1947, Mr. Esgate has been active in the development of equipment and methods of operation for use in the production and handling of pulpwood by the pulp and paper industry as a staff member of the American Pulpwood Association, and as an independent consultant operating the firm of E. E. Esgate Associates with offices in New York City.

Mr. Esgate was born in Idaho, educated in Idaho and Washington schools in mechanical engineering, and had his early business experience in the logging and lumber industry in the Pacific Northwest. He worked for the U. S. Forest Service both there and in New England, and in 1941 served in a civilian capacity with the Corps of Engineers on the development of mechanical equipment for the Army Engineers. He was in active service in the European theatre from 1942-1945, at which time he was returned to inactive duty, and rejoined the Engineer Board at Fort Belvoir, Virginia, in a civilian capacity as Chief of the Construction Equipment Section, again responsible for design, development and testing of construction equipment to be employed by the Army Engineers in the future.

E. E. Esgate

Philip E. Whiting

AUTOMATIC TRANS. OPENS FACTORY SALES BRANCH— ALSO PARTS DEPOT, N.Y.C.

A factory branch sales office in New York City and a service station and parts depot for its entire eastern territory have been established by the Automatic Transportation Company, Chicago. Operation of the new branch began June 1.

The sales office is located at 347 Madison Avenue, and the service station and parts depot at 1749 York Avenue.

Philip E. Whiting, with Automatic since 1915 in various capacities, has been appointed eastern district manager. He will direct both New York operations. The service station and parts depot will be headed by Robert O. Divine, service manager, who has been with the company since 1926.

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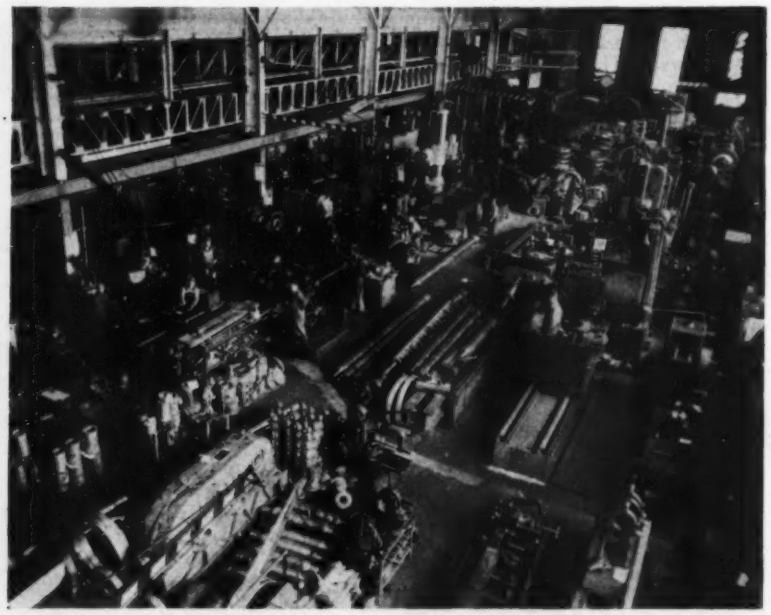
▶▶▶ A DISTRICT OFFICE for the territory of Kentucky, southwestern Ohio and northeastern Indiana was recently opened by Wheelco Instruments Company of Chicago. E. C. McFaul has been named manager of the new office which is located at 307 East



One section of the D. J. Murray Manufacturing Co. model machine shop that extends for one block along the side of Third Street, Wausau, Wis.

Another Use

for

KALAMAZOO GLAZED TILE

CLEAN, BRIGHT INTERIOR WALLS

A Lifetime Job

Kalamazoo glazed tile used for interior walls in all sections of the mill provides bright, clean surfaces which are easily washed and never need painting even when subjected to corrosive and damp conditions.

KALAMAZOO TANK & SILO CO.
KALAMAZOO, MICHIGAN

Fourth Street, Cincinnati 2, Ohio. A territory consisting of the entire state of North Carolina has been assigned to J. L. Highsmith & Company, 111 Corcoran Street, Durham, North Carolina.

▼

SILVER PLAQUE AWARDED HARRIS-SEYBOLD IN ABP ADVERTISING CONTEST

A first place silver plaque was awarded the Harris-Seybold Company, Cleveland, Ohio, in the 7th Annual Business Paper Advertising Contest for its insert program appearing in graphic arts and advertising trade journals. The award was presented by E. J. Hamm, Jr., president of Associated Business Papers and publisher of *Traffic World*, at a luncheon in Philadelphia.

The campaign which won top honors in division 7 of the contest was beamed at buyers of printing, and was original in that its primary message was devoted to selling its customers products. This series of inserts told a forceful story of quality lithography in selling and marketing circles.

This is the third award presented Harris-Seybold's institutional campaign during recent months. One of the inserts in the campaign won top honors at the Engravers Luncheon of the New York Art Directors Club, and it is believed that this is the first time a planographic plate was cited for "Excellence in Reproduction" at an Engravers Luncheon.

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▶▶▶ "FAMILY DAY" for the employees of The Lindsay Wire Weaving Company, Cleveland, Ohio, and their families was held Sunday afternoon, May 15. The affair was held in response to numerous requests made by members of the Lindsay force, some of whom gained for the first time an idea of how other departments synchronized with their own. "We are convinced," writes A. Fred Crossman, president, "that a get-together of this kind does much to promote the understanding between management and men which means so much to the future of American industry."

▼

NORTON CO. ESTABLISHES NEW MIDWEST SALES AREA

Reorganization of sales areas by the Norton Company, Worcester, Massachusetts, including the establishment of a new region in the central United States, was announced last month at a district sales managers' conference held in the company's main offices. Creation of the new region became effective June 1.

A NEW CUSTOM has been inaugurated by Reliance Electric & Engineering Co., of Cleveland. This company will invite its stockholders to attend its exhibits at various industrial expositions throughout the country. Illustrated here is the first of these visits at the American Mining Congress Coal Exposition and Convention in Cleveland, ended May 12

The change adds a third area called the Central Region to the company's U. S. sales coverage. Up to now the company has divided its sales force into two basic regions—Eastern and Western. The new area will include the territories around Cleveland and Detroit. Formerly, Cleveland had been part of the Eastern Region and Detroit part of the Western Region.

Donald L. Price, Detroit district manager for the company's abrasive division since 1944, was appointed sales manager of the new region. William A. Russell, abrasive engineer in Toledo, has been named to succeed Mr. Price.

The Eastern Region, which now includes the New England, Philadelphia, and Pittsburgh districts, remains under the supervision of George A. Park, sales manager. The same applies to W. Earle Shumway, sales manager, Western Region, who will continue to direct the activities of the Chicago, St. Louis, and Pacific Coast district.

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▶▶▶ THREE NEW distributors of Trambeam overhead crane and Monorail systems have been appointed by the Whiting Corporation, Harvey, Illinois, and Los Angeles, California: George E. Miller Company, 24 Brighton Avenue, Boston 34, Massachusetts, in the Boston territory; Grays Metal Works, Inc., 56th Street and Grays Avenue, Philadelphia 43, Pennsylvania, for the Philadelphia territory; and James J. Burke Company, 405 Kearns Building, Salt Lake City 1, Utah, for that territory.

▶▶▶ A NEW OFFICE which will serve the New England and eastern seaboard states has been opened at 55 West 42nd Street, New York City (Telephone Longacre 4-2877) by the Hudson-Sharp Machine Company of Green Bay, Wisconsin. It will be the headquarters for Vice President and Eastern Sales Manager C. A. Wetli, who covered this territory previous to and since the late war.

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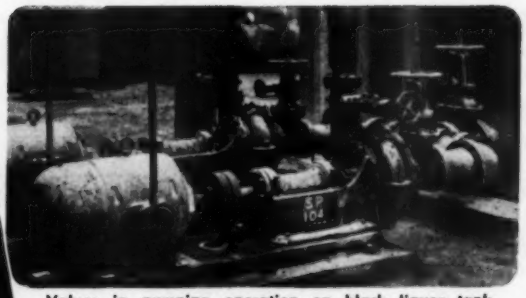
E. F. HOUGHTON & CO. ESTABLISHES NEW PROD. DEVELOPMENT DEPARTMENT

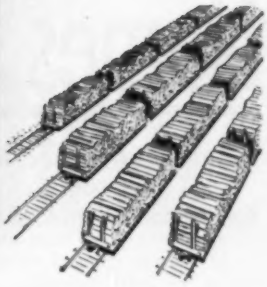
A new product development department has been established by E. F. Houghton & Company, Philadelphia, Pennsylvania. It has been set up to facilitate the handling and evaluation of newly developed products, and to bring about closer co-operation between the research, production, and sales staffs.

Dr. H. B. Walker has been named manager of the new department. He has been assistant to Dr. R. H. Patch, vice president of operations, and in that capacity has directed application research and supervised production and engineering problems for the company. Mr. Walker will relinquish his former duties as assistant to Dr. Patch, and as manager of product development, will work towards the discovery of new product needs through market research. He will review ideas, and initiate necessary research for new applications of existing products, give technical service to customers on new products, and supervise application research.

Typical valve installation on pumps to evaporators.



Valves in pumping operation on black liquor tank.



Southern Paperboard Corporation Selects

LUNKENHEIMER VALVES

for Port Wentworth Mill

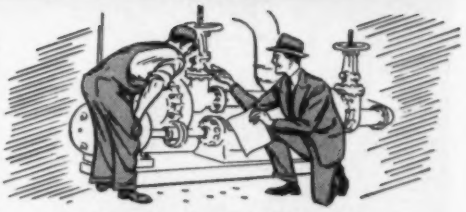
Sextuple evaporator furnished by General American Transportation Corporation. Lunkenheimer Valves in caustic lines.

IN THIS outstanding new plant, as in many of the nation's other paper mills, LUNKENHEIMER Valves were selected for tough jobs. Producing an average of 450 tons of linerboard and similar products per day, a minimum of ten million gallons of water are used every twenty four hours.

For the lines handling caustic and alkaline liquors (black, green and white), "CAUSUL" Metal Gate Valves were specified by engineers, J. E. Sirrine Company of Greenville, S. C.

In other parts of this giant plant, Iron Body Gate Valves and "Ferrenewo" Valves were used where bronze valves did not meet requirements. Numerous other LUNKENHEIMER Valves, including "King-Clip" and Hose Gate were installed.

Selected for applications in many industrial fields, "CAUSUL" Metal Valves handle close to 100 corrosive solutions ranging from Acetic Anhydride to Zeolite and including acids, solvents, alkalis, alcohols, food products, brines and wastes.



YOUR LUNKENHEIMER DISTRIBUTOR maintains adequate stocks for your needs. Ask him for Circular No. 592 which gives complete details on "CAUSUL" Metal Valves, and for confidential information blank from which definite recommendation for corrosive service can be prepared. Other descriptive literature also available.

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THE LUNKENHEIMER CO.

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NEW YORK 13 CHICAGO 6

BOSTON 10 PHILADELPHIA 34

EXPORT DEPT 318-322 HUDSON ST., NEW YORK 13, N.Y.

Names in the News...

LUKENS STEEL PROMOTIONS

Three promotions on the staff of Lukens Steel Company, Coatesville, Pennsylvania, have been announced by L. M. Curtiss, general works manager. Harry A. Fohl, assistant to the chief engineer and formerly master mechanic, has been named chief engineer; Neils H. Jensen, plant engineer with By-Products Steel Company and Lukenweld (both divisions of Lukens) and formerly assistant to the chief engineer, has been made assistant chief engineer; and Malcolm B. Antrim, assistant superintendent of electrical maintenance, has been appointed superintendent of electrical maintenance. All promotions were effective May 1.

P. C. Haldeman, who has been chief engineer since 1932, and Walter H. Burr, superintendent of electrical maintenance since 1921, will both retire on July 1, each having reached the age of 70 years. Mr. Haldeman has been associated with Lukens since 1901, except for a brief interlude in 1905, and was master mechanic and chief consulting engineer prior to 1932. Mr. Burr joined Lukens in 1921 as superintendent in the electrical department and has served continuously in that position since that time. Both men will act as advisors during the remaining months of their active duty with the company.

▼

BAKER AND ROSENTHAL MOVED UP IN PUMP DIV. OF HAMILTON-THOMAS CO.

An announcement from the Hamilton-Thomas Corporation, Hamilton, Ohio, records the election of E. E. Baker as vice president of its Public Works Pump Division, and W. G. Rosendahl as vice president of its Machine Tool Division.

Harry A. Fohl

Neils H. Jensen

Malcolm B. Antrim

Dr. George T. Felback, John Wesley Hyatt Award winner for 1948, is shown being commended by Dr. Donald S. Fredericks (left), vice president, Rohm and Haas Co., and John D. Cochrane, Jr. (right), last year's winner of the award, and director, research and development, The Formica Company

Mr. Baker has been associated with the pump industry since leaving college. His previous connections were with Byron Jackson & Company and Pomona Pump Company. In 1945 he became manager of distributor sales for Economy Pumps, a division of Hamilton-Thomas Corporation.

Mr. Rosendahl has been with the company since 1941, first as general superintendent, later as assistant manager, then manager of sales of its Liberty Planers Division.

▼

OHIO BOXBOARD ELECTIONS

Two organizational changes were made by the board of directors of The Ohio Boxboard Company, Rittman, Ohio, at the annual meeting. F. O. Kanehl, who has been serving the company in the capacity of secretary and treasurer, was elected vice president of finance and treasurer for the company. M. E. Barthen, assistant secretary, was elected secretary of the company. Mr. Kanehl was elected assistant secretary.

At the stockholders meeting, held on the same day, the existing board of directors was re-elected for the ensuing year, and the following officers were re-elected: Wayne Young, president; C. E. Carpenter, senior vice president; B. M. Thomas, vice president, production; J. N. Andrews, vice president, sales; and G. H. Clippinger, assistant treasurer.

▼

CHAS. GRANT LEAVES SANDY HILL—WILL MANAGE NEWLY FORMED EMPEROR P. & P. CO.

After nearly eight years with The Sandy Hill Iron & Brass Works, Hudson Falls, New York, Charles J. Grant of the sales engineering staff has resigned to assume the managership of the newly organized Emperor Pulp and Paper Company, Inc., at Marcellus Falls, New York. On his departure friends at Sandy Hill wished him success in his new position, which will enable him to use his broad paper mill experience in a management capacity.

The Emperor Pulp and Paper Company is a newly organized Glens Falls concern, having purchased the former Marcellus Falls Paper Mills, Inc., at Marcellus Falls, Onondaga county, New York. Sections of the mill's operating machinery have been completely overhauled and rebuilt by the Sandy Hill Iron & Brass Works, and additional modern equipment is being installed.

Mr. Grant's varied experience includes bridge rebuilding in New England, a period of employment with the Texas Oil Company, and about 1936 he began working for the Union Bag and Paper Corporation in their Feni-

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Carries a complete stock of rebuilt equipment of the following types:

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- SLIPRING MOTORS
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- M.G. SETS
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- HOISTS
- CRANES
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- PUMPS

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and
SALES DISTRIBUTION
of
ELECTRICAL POWER EQUIPMENT

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REBUILT SQUIRREL CAGE MOTORS

H.P.	Make	Type	Volts	Speed
700	G.E.	K	2200	1800
500	G.E.	K	440	3600
500	G.E.	KTP	440	1800
400	Al. Ch.	Spl. pf.	2300	900
400	Westg.	C.S.	2200	1800
350	Westg.	C.S.	2200	900
300	G.E.	I.K.	440	900
250	G.E.	I.K.	2200	900
250	Westg.	C.S.	2200	1800
200	G.E.	K	2200	720
200	G.E.	K.P.	2200	705
200	Westg.	C.S.	440	720
150	G.E.	K.T.	2300	600
150	Cont.	TEFC	440	900
125	Westg.	C.S.	440	3600
125	G.E.	TEFC	440	1200
100	Al. Ch.	A.R.	440	514
100	Al. Ch.	A.R.	440	900
100	U.S.	Vert.	440	1200
100	Burke	E.M.	440	1200
75	Triumph	T.E.	2200	514

PHONE: CANAL 6-2900

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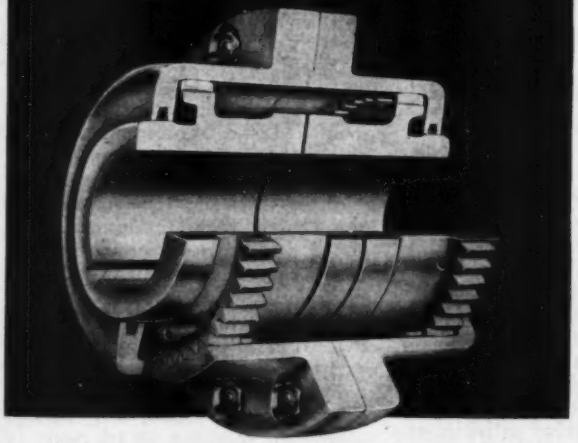

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—Prosize Process is 200 to 300% more efficient.

—Prosize Process produces a better, more stable size which gives paper uniform resistance to liquids of various types, such as ink, water, meat juices, etc.

—Prosize Process permits duplication of results from run to run on grades never before made because of sizing difficulties.

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—Prosize Process permits sizing at a higher or more neutral pH.

—Prosize Process requires from 35 to 65% less rosin size and from 15 to 30% less alum, making it generally *less expensive* to use.

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more mill. Here he worked through the entire papermaking process, beginning in the stock preparation, and remained there until the closing of the Fenimore mill in 1941. At Sandy Hill, he worked as a machinist during the war program, and then transferred to the engineering department. He was made assistant chief draftsman in 1946, later becoming a field erection engineer, until a year ago when he was transferred to the sales department as a sales engineer.

Directors of the new company are Harold Yanklowitz and Arnold Slawsby, both of the Yanklowitz Waste Company, Inc., and Joseph B. MacLaren, president of MacLaren, Inc., all of Glens Falls.

▼

HOOKINGS RETIRES FROM ALLIED PAPER MILLS, LTD. SUCCEEDED BY FOWLER

The retirement of H. Hookings, mill superintendent of the Lybster Division, Alliance Paper Mills, Ltd., Merritton, Ontario, has been announced. On July 1, Mr. Hookings terminates a service record of approximately 35 years with the Alliance Company.

At the age of 14, Mr. Hookings began his papermaking career in the Thomas Owen and Company Paper Mills, Cardiff, Wales, his native land. He came to Canada in 1907 and became associated with the Lincoln Pulp

Harry Hookings

John Fowler

and Paper Company in Merritton. The following year that mill was destroyed by fire, but Mr. Hookings was employed in the company's other plants until he entered service in World War I. He returned to work with the Lincony company, then held positions with Dryden Pulp and Paper Company, also Kinleith Paper Company. He returned to the Lincoln company in 1928 just before the company became known as the Alliance Paper Mills.

Appointed to succeed Mr. Hookings is John Fowler, who has been assistant mill superintendent of the Alliance Lybster Division since 1948. He has a successful record with several large mills in Canada and has worked in practically all operations on a paper mill. Mr. Fowler was born in England, but came to Canada in 1910. He graduated in chemical engineering at the University of New Brunswick in 1938. He was in World War II and served in Germany in connection with the Pulp and Paper Allied Control Division.

▼

▶▶▶ *Samuel Wit,* who has been a sales engineer with Lukenweld, machinery-making division of Lukens Steel Company (Coatesville, Pennsylvania), assisting in the New York, Boston, and Syracuse offices, has been named district manager of sales of the Chicago office. Mr. Wit started with Lukenweld in 1937 as a draftsman and engineer, and has subsequently been superintendent of Plant 2, assistant chief engineer, executive engineer, and finally sales engineer.

J. H. Faunce, Jr., present manager of the Chicago office, will assume other duties with Lukens about July 1, when Mr. Wit's appointment becomes effective.

▼

▶▶▶ *L. C. Carturight* was elected secretary of Foster D. Snell, Inc., New York, at the corporation's annual meeting held at the home office in Manhattan. He will continue as account executive of the firm, with which he has been associated since 1936.

Dr. Albert F. Guiteras, a native of Cuba and a director of bacteriology and toxicology for the Snell organization, was elected treasurer at the annual meeting.

Louis J. Bowlby, Jr., was made assistant treasurer. He joined Snell's accounting department in 1947.

▼

LOCKBAUM TO FILL NEWLY CREATED POST AT SCOTT—STAFF PAPERMAKING ADVISER

To the newly created position of staff papermaking adviser, Scott Paper Company has promoted George J. Lockbaum. In his new capacity Mr. Lockbaum will report directly to the general manager of paper mills.

Mr. Lockbaum will be available for consultation and special assignments in all Scott paper producing plants, and his circuit will include the plants at Chester, Pennsylvania; Marinette, Wisconsin; and Fort Edward and Glens Falls, New York. He also will have a part in the papermaking activities at Milford, New Jersey, where the company owns two machines.

A veteran of more than thirty years in the paper business, Mr. Lockbaum has been employed by Scott since 1930. He has worked in many mills both in Canada and the United States, and has acquired a wealth of experience in papermaking.

POLLEYS JOINS SALES STAFF AT DOWNINGTON

Associated with the paper industry for the past 25 years, R. W. Polleys recently joined the sales staff of the Downingtown Manufacturing Company, Downingtown, Pennsylvania.

For the past three years, Mr. Polleys has been located in Cleveland as a consulting engineer to the paper industry, specializing in stock preparation. Prior to that he had served in various engineering capacities with the Bryant Paper Company, Kalamazoo, Michigan; Mead Corporation, Chillicothe, Ohio; Kimberly-Clark Corporation, Kimberly, Wisconsin; and Fort Wayne Corrugated Paper Company, Hartford City, Indiana.

Mr. Polleys is a member of the Technical Association of the Pulp and Paper Industry and of the American Pulp and Paper Mill Superintendents Association.

R. W. Polleys

J. H. Leslie

J. H. LESLIE IS SIGNODE CHAIRMAN—FATHER MOVES UP TO CHAIRMAN OF BOARD

At the annual meeting of the board of directors, John H. Leslie, formerly vice president in charge of research and engineering, was elected president of the Signode Steel Strapping Company, Chicago. Mr. Leslie succeeds his father, John W. Leslie, who became chairman of the board. John S. Gorman, formerly vice president and director of sales, has been elected vice chairman of the board. With Mr. Gorman's election, J. M. Moon was promoted from sales manager to director of sales.

The new president, at 35, is one of the youngest top executives in industry. His extensive background in steel strapping research and engineering fits him for this position. His father, as chairman of the board, will continue to give the company the advantage of his many years of experience.

▼

▶▶▶ *James W. Hepburn* has been made assistant manager of the vertical turbine pump division of the Worthington Pump and Machinery Corporation, Harrison, New Jersey. His headquarters will be at the corporation's

DIAPHRAGM ?

?

STUFFING BOX ?

NO!

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SPRINGS ?

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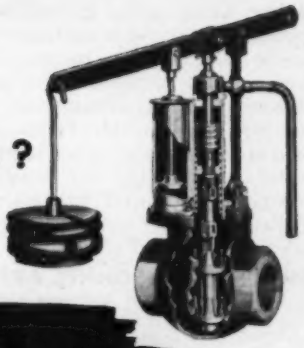

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Suitable for any reduced pressure between 10 and 150 pounds. Sizes 1½ inch have screwed ends; larger sizes have either screwed or flanged ends.

Applications include main reduction to distributing head, auxiliary engines, vulcanizers, kettles, ironers, dryers, and pumps.

For complete details, write Dept. AY-6 for Bulletin No. 146.

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Left: Standard (spring action) Micrometer; Right: Dead Weight (Gravity type) Micrometer

Cady horizontal dial micrometers are built to precise specifications, and are in use throughout the industry as desk models as well as on the production line. Many are being used for continuous calipering where operations favor this type of measurement. The dials are glass covered, 6" diameter, and are calibrated for easy, exact reading in 1/1000ths or half-thousandths of an inch. The models shown above have 4" throats, but the Standard (left) micrometer is also available with 7, 12, or 18" throats. Standard model calipers sheets up to 5/16" thick; Dead Weight model up to ½" thick. We also manufacture a Corrugated Liner Micrometer for calipering flute thickness of boards. All models available for early delivery. For paper makers, users, fabricators, the Cady Tester makes the "Cady" or Mullen Bursting Strength Test. Cady Basis Weight Scales show weight in lbs. per sheet count for papers and tissues; Boxboard Scale shows number of sheets per 50 lb. bundle.

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Denver works, where he will be responsible for customer relations in the sale of vertical turbine pumps in Chicago and the territories west of the Mississippi River, including St. Paul and New Orleans. Mr. Hepburn has been in the reciprocating pump division at the company's Harrison works, and previously was district manager of its El Paso office.

▼

SHIFTS IN PERSONNEL ARE ANNOUNCED BY PENNSALT

Appointment of Albert H. Clem as assistant manager of sales of the special chemicals division has been announced by the Pennsylvania Salt Manufacturing Company. Mr. Clem, who has been field sales supervisor of the division, also will assume the duties formerly performed by Philip C. Staples, Jr., as product supervisor on cleaners.

Mr. Staples has been transferred to the company's heavy chemicals division as a product supervisor, along with George D. Grogan, who was formerly assistant to R. S. Roeller, field sales manager of the division.

Effective June 1, Mr. Roeller became manager of sales of the heavy chemicals division, and in this capacity will assume, in addition to his present duties, those formerly performed by Fred Prince, who leaves the sales department on that date to become chairman of the Centennial Committee. Mr. Prince will devote his entire time to preparing for Pennsalt's 100th anniversary in 1950.

▼

▶▶▶ *John E. Carroll* has been appointed general sales manager of the American Hoist and Derrick Company, St. Paul, Minnesota. Mr. Carroll originally started to work for American Hoist in 1937 as a district sales representative, but resigned his sales position to become a partner in the firm of Harron, Rickard and McCone Company of Southern California, heading the construction equipment division. On his return to American Hoist, Mr. Carroll brings with him additional field experience and a broader understanding of company-customer relationships.

▼

NEW OFFICERS ELECTED FOR INDUSTRIAL RESEARCH INST.

At the annual meeting of the Industrial Research Institute, Inc., held May 23-25, the following officers were elected: J. H. Schaefer, vice president of the Ethyl Corporation, was elected president; C. F. Rassweiler, vice president for research and development of the Johns-Manville Corporation, was elected vice president; C. G. Worthington was reappointed secretary-treasurer, and Fred Olsen, director of research and development of Olin Industries, Inc., together with H. N. Stephens, research director, Minnesota Mining and Manufacturing Company, were elected to three-year terms on the board of directors.

The meeting was held at the Hotel Berkeley-Carteret, Asbury Park, New Jersey, and at the new Johns-Manville Research Center, Manville, New Jersey. One hundred and twenty-five research executives from member companies and their guests attended and discussed current problems and trends affecting industrial research.

▼

▶▶▶ *Everett S. Bissell* is now with The Patterson Foundry and Machine Company, East Liverpool, Ohio, as vice president in charge of sales, research laboratories, chemical engineering, and process engineering. He was formerly vice president and general manager of Mixing Equipment Company, Rochester, New York.

E. S. Bissell

Robert E. Marshall

▶▶▶ *Robert E. Marshall* has been elected secretary of the Worthington Pump and Machinery Corporation, Harrison, New Jersey, succeeding the late C. Neal Barney. His headquarters will be at the company's New York offices at 2 Park Avenue. Mr. Marshall has been with the company since 1947, serving as a member of the legal department, counselor on industrial relations, and assistant secretary.

▼

▶▶▶ *C. W. Nelson,* an assistant vice president of Kimberly-Clark Corporation, has been elected to the board of directors to fill the vacancy caused by the death of C. B. Clark (see P.I. and P.W., May, 1949). Mr. Nelson has been with the company since 1913, and was chief engineer for many years.

▼

▶▶▶ *Gilfry Ward* has been appointed vice president in charge of sales of the American Manganese Steel Division of the American Brake Shoe Company. He will be located in Chicago Heights, Illinois. Mr. Ward has been with the company since 1928, and has spent many years on both the east and west coasts with the Amsco sales organization.

▶▶▶ *Frederick L. Seibold* was recently appointed sales manager by Schutte and Koerting Company, Philadelphia, Pennsylvania. Prior to his appointment, Mr. Seibold, who has been with the company for 28 years, served as sales engineer in the Philadelphia area.

▼

▶▶▶ *Joseph C. Blauvelt* has returned to his position as assistant vice president of Stein, Hall & Company, Inc., New York, New York, after several years of retirement. He will head up the purchasing of imported and domestic starches and flours for the company, as he did until his retirement in 1943 for the purpose of devoting his attention to farming. He had been with the company since 1919.

▼

▶▶▶ *Harold W. Peck,* resident engineer for the National Paper Products Company, Carthage, New York, (division of the Crown-Zellerbach Corporation) for the past five years, has accepted a position as chief engineer of the Peter J. Schweitzer, Inc., paper plant in Spotswood, New Jersey.

▼

▶▶▶ *John P. Schwede* has been appointed director of export sales for the Union Bag & Paper Corporation, New York, New York. He succeeds R. A. Stevens, who is now consultant to the export department. Before joining Union Bag, Mr. Schwede was with the marketing departments of The Standard Oil Company of New Jersey and the U. S. Rubber Company, spending much of his time abroad.

▼

▶▶▶ *Lionel M. Goldberg,* vice president and director of National Container Corporation in charge of the Long Island City plant, has been elected comptroller and assistant treasurer of the company. Mr. Goldberg joined National Container in June, 1928, and was elected a vice president and director in 1937.

▼

▶▶▶ *C. F. Bonnet* has been appointed production manager of the industrial chemical division, American Cyanamid Company, New York, New York. He has been with the company for more than 15 years, and was formerly assistant general sales manager of this division.

G. W. Russell simultaneously was made assistant sales manager of the same division, taking over the sales duties previously handled by Mr. Bonnet. Prior to his new appointment, Mr. Russell was manager of the new products development department.

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WHEN your rubber-covered suction press rolls become clogged, chances are that rolls need thorough cleaning. And here's an easy Oakite Method for handling that important job:

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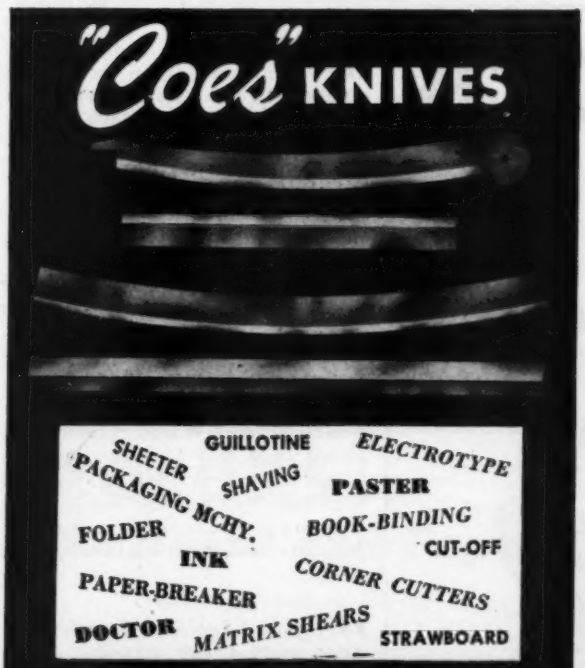

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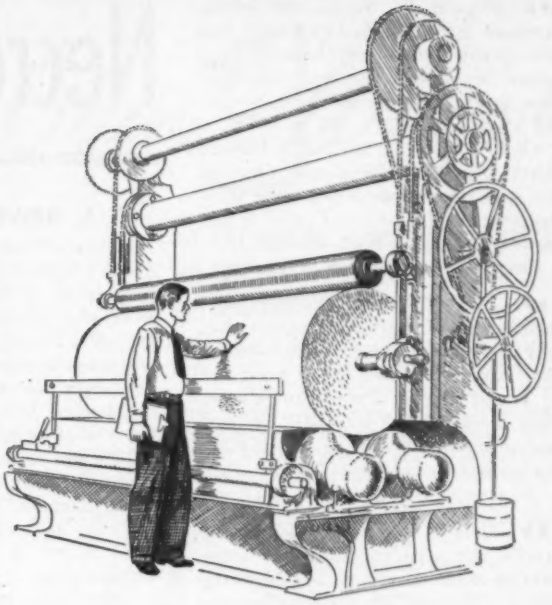

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Butterworth Calender Rolls

▶▶▶ *Thaxter W. Small,* 607 North Patterson Street, Valdosta, Georgia, has been made sales representative for Sprout-Waldron & Co., Inc., handling sales and service for their customers in the South.

C. W. Converse, 124 North Durkee Street, Appleton, Wisconsin, was at the same time appointed to serve their customers in the pulp and paper industry in the Middle West.

▼

▶▶▶ *J. D. Johnston,* former sales manager of W. Ralston Company, Inc. and of the Gaylord Container Corporation, has been named to the sales staff of Union Bag & Paper Corporation, New York, New York. Mr. Johnston will promote the sales of Union Bag's Scutan waterproof paper lines.

▼

▶▶▶ *George B. Beitzel,* formerly executive vice president, is the new president of the Pennsylvania Salt Manufacturing Company. He succeeds Leonard T. Beale, who after serving as president for 20 years was elected chairman of the board at the company's annual meeting in Philadelphia.

William P. Drake, formerly an assistant vice president, was made vice president in charge of Pennsalt sales at the annual meeting.

Necrology . . . . . .

S. NEWTON FINNEY

A vice president of the John Waldron Corporation, New Brunswick, New Jersey, S. Newton Finney, passed away May 22 in Metuchen, New Jersey. Mr. Finney had been engaged in the manufacture of textile and paper machinery for many years, and was a member of various technical societies. He was 61 years old.

Previous to his association with the John Waldron organization in 1923, Mr. Finney had served in an engineering capacity with Dill & Collins, Inc., and Moore & White Company of Philadelphia.

His widow, two sons, and a brother survive him.

▼

▶▶▶ *William H. Croft,* of Chicago and Los Angeles, former president of the Magnus Metal Corporation (Fitchburg, Massachusetts) and vice president and director of the National Lead Company (New York, New York) passed away May 13 in Los Angeles. He was 71 years old. Surviving are a son, William H. Jr., of Greenwich, Connecticut, and two daughters, both of Chicago.

▼

COL. C. H. L. JONES

Well known for his work in the development of the Canadian pulp and paper industry, Colonel C.H.L. Jones passed away in Quebec on May 22.

Born and educated in Montreal, Colonel Jones attended McGill University. He was president of several Canadian paper companies, including Mersey Paper Company Ltd., Liverpool, N.S. He was a former president of Price Bros. and Company Ltd., and continued on its board of directors when he resigned because of ill health last year.

Throughout the first World War, Colonel Jones served in Canada, England, and France. He raised and commanded the 227th Battalion of the Canadian Expeditionary Force and received the Order of the British Empire in France.

▼

▶▶▶ *John A. Lloyd,* an executive in the paper trade for many years, passed away May 4 in Utica, New York. At the time of his passing, he was proprietor of the Neltex Apron Company in Utica. In 1916 he became sales manager for the Sauquoit Paper Company, and eight years later was appointed sales manager of the Royal Paper Company. Surviving are his widow, a daughter, and a son.

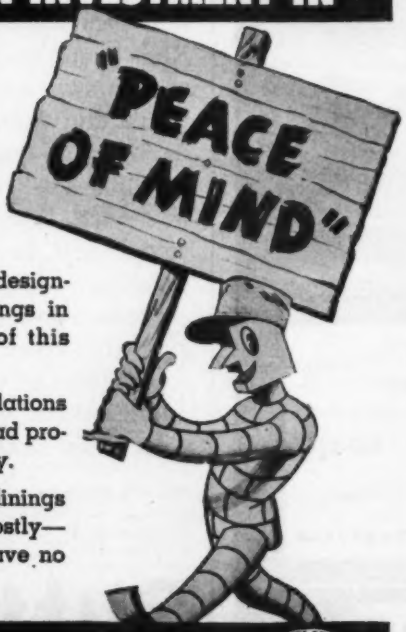
▼

▶▶▶ *S. B. Waring,* secretary-treasurer of the Morse Chain Company, subsidiary of Borg-Warner Corporation, passed away May 11 in his home in Ithaca, New York. Mr. Waring had been associated with the Morse Chain Company in Ithaca for the past twenty years. He was born in England in 1889.

▼

▶▶▶ *John Appleton Knowles,* for many years a vice president of the St. Croix Paper Company of Boston, Massachusetts, and Woodland, Maine, passed away at Francestown, New Hampshire, May 21. He was 67 years old. He had retired from the company more than two years ago. He is survived by the widow and two sons.

A STEBBINS LUMP SUM CONTRACT IS AN INVESTMENT IN



WHETHER the contract covers one chest or tank lining, or all the corrosion or alkali resistant linings for the entire mill, it is Stebbins responsibility to provide a dependable and satisfactory job that assures continuous operation.

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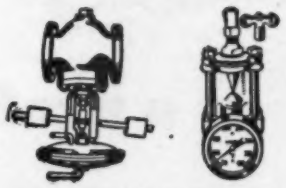

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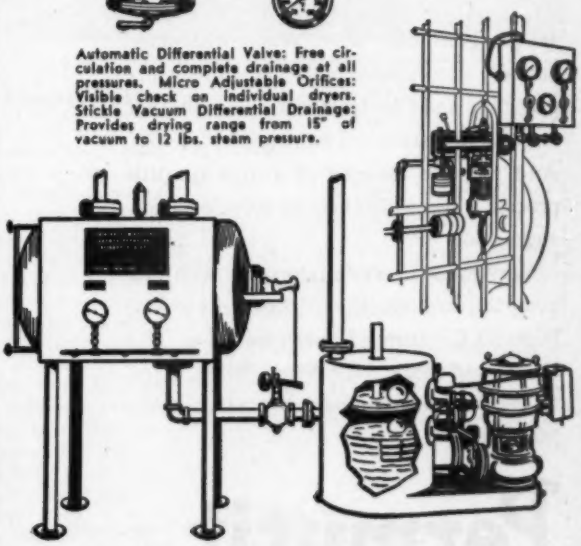

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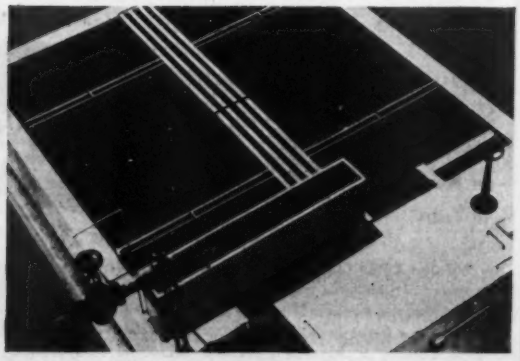

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PRACTICAL SHORTS

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Handling Rolled Materials with Twin-Belt Sling

Here's a useful idea which simplifies the hoisting of paper and other rolled materials. Two sections of wide belting are secured at each end to specially formed sections of bar stock and fashioned into a hoisting sling which handles awkward rolls without the risk of their sliding out or swinging dangerously as they are transported. The sling is wrapped quickly around the roll as it lies in storage or in a machine, and is attached to a hoist hook for transportation through the air above machinery and supplies. Transporting overhead avoids obstacles which necessarily would be encountered if the roll was transported over the floor.

The hoist used in this case is a five-ton variable speed motor-driven trolley type. It is mounted perpendicularly to the I-beam on which it travels. As shown in the illustration (a scene photographed in a large paper mill), the operator controls lifting, lowering, and transverse motion by push-button controls. A metal chain supports the control box and takes all weight from the electrical cable. Notice that all three overhead I-beams shown are equipped for hoist operations. At the extreme left a portion of another hoist can be seen. These adequate hoisting facilities provide for quick and efficient handling and make use of oft-wasted overhead space, or "air-rights."—YALE & TOWNE MANUFACTURING CO. (Philadelphia Division).

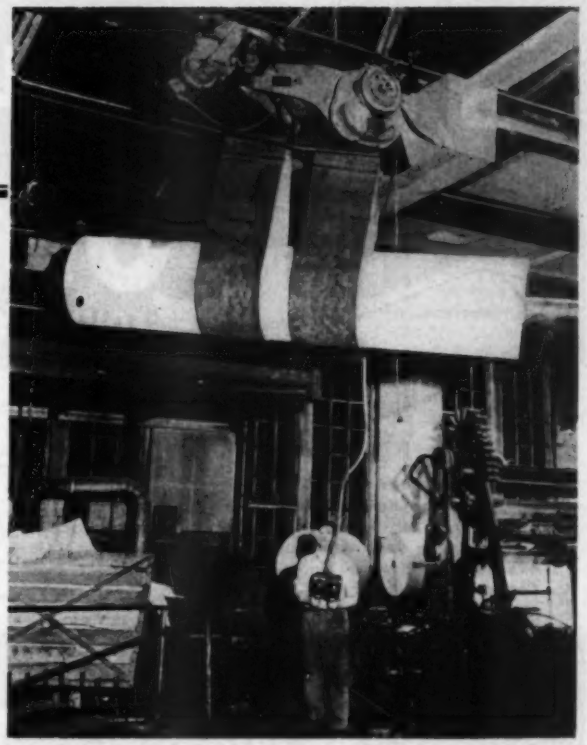

Fig. 1 (left, above)—Here is the broken casting before it was cleaned or beveled. . . . Fig. 2 (left)—The break has been beveled to about a 90-deg. angle, and the surface has been cleaned for about ½ inch back from the edge. Notice, too, that the vee does not go across the break. This helps to line up the parts

Getting Ready to Bronze-Weld

Clean the part thoroughly—that's the secret of all good bronze-welds. Here's why: You get a strong bronze-weld only when the molten bronze rod flows easily and evenly over the metal surface. It's called "tinning." It acts just like water on clean glass. When water is spread on a glass plate that is not clean, it will separate into tiny drops. Molten bronze rod does the same thing on dirty steel or cast iron, and when it does not flow evenly, the weld will be weak.

Remove all oil, grease, scale, rust, or oxides from the beveled edges or the facing edges of the part. The top and bottom surfaces should also be cleaned for about a half-inch back from the edges. This mechanical cleaning should be done by a grinder, stiff wire brush, file, emery cloth, or steel wool. If the cleaning is done by grinding, go over the part afterwards with a file to remove any small particles picked up from the grinder.

The surface of the edges to be welded must also be cleaned chemically. That means that you must use a liberal amount of flux when you weld. The flux can be sprinkled in the weld area or applied by dipping the end of the heated rod into the flux can. Welding rods that have been pre-coated with flux are also available. With these rods you are always sure of getting the proper amount

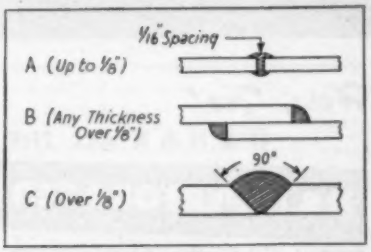

Fig. 3—This sketch shows two types of joints for metal up to ⅛ inch thick and more than ⅛ inch thick

of flux in the weld and you save time that would be spent in dipping the rod into the can.

Joint Preparation

When the material is more than ⅛ inch thick, the edges of each part should be beveled to a 30- to 45-deg. angle. Just as in fusion welding, you must get complete penetration through the bottom of the vee. Beveling the edges of heavy sections as shown in Figure 3 will help you to get the proper penetration. For thinner material just clean the edges. The edges of all material, including cast iron, steel, copper, brass, and galvanized iron should be prepared in the same way.

Grinding, chipping, and machining are suitable methods for beveling these edges. However, these methods may smear the graphite present in the casting and make proper tinning difficult. The graphite can be removed by quickly heating the edges to a dull red with a blowpipe, then cleaning them with a wire brush when they cool.—From *Linde Tips*, published by THE LINDE AIR PRODUCTS CO.

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International Review.....

News from Other Countries . . Technical Developments Adapted from Foreign Literature

The German Cellulose Industry

OTTO GOY

▶▶▶ IN CONSEQUENCE of the war events and of the dismantling of factories, the capacity of the German pulp and paper industry has become much diminished. Before the war, the production of cellulose amounted to 15,000 t (1 ton = 1000 kg) a year. Thirty per cent of this capacity is in the American zone, 8 per cent in the British zone, 4 per cent in the French zone, and 58 per cent in the Russian zone of occupation and in the territories lost to the USSR and to Poland.

By the loss of the pulp mills in East Germany, the capacity of the German cellulose industry is now hardly amounting to 30 per cent of the former one. But even that capacity could not be utilized for lack of coal, and particularly of wood.

Among well-known pulp mills which have been expropriated by the Soviets are the great plants situated near Koenigsberg, at Tilsit, and at Ragnit. Further, the following factories east of the Oder-Neisse line have been lost to Poland: Odermuende, Johannesmuehle, Maltsch, Oberleschen, Wartha, Krappitz, Czulow, Cosel, and Stahlhammer. As to the pulp situated in the Soviet zone, 23.4 per cent of their capacity has been dismantled; 10.8 per cent is utilized by the Soviets; 57.8 per cent has been appropriated by the State, and only 8 per cent remains in private hands. The great works, such as the mills at Pirna, Blankenstein, Wittenberge, and Heidenau, have been nationalized. Only smaller works remained in private ownership.

The pulp plants of the three western zones have not been dismantled, but have been partly destroyed or seriously damaged during the war. The Mannheim works of the Zellstoffabrik Waldhof, for instance, lost part of its capacity by the war events. After the loss of its East German works and the modern plant at Kexholm, Finland, this firm still has plants at Mannheim, Kostheim, Kelheim (Bavaria), and at Wangen (Wurtemberg).

Likewise, the Walsum works of the Aschaffenburger Zellstoff-Werke A. G. were partly demolished during the war. Only the pulp mills of Aschaffenburg, Stockstadt on Main, Walsum (Lower Rhine), and at Redenfelden (Bavaria) remain in possession of that trust, while the large plants at Pirna and Heidenau (Soviet zone), and at Memel, Lithuania, were lost.

In the British zone, the only mill of some importance is that at Walsum, which is, however, not yet fully occupied. Therefore, the paper mills of the British zone must be supplied with paper pulp imported from the American zone and from abroad.

The American zone is supplied with cellulose by the great mills of the Zellstoffabrik Waldhof and of the Aschaffenburger Zellstoff-Werke A. G. The annual bizonal demand of paper pulp is estimated at about 200,000 tons of cellulose, 77 per cent of which should be furnished by the American zone, and 23 per cent by the British zone, reckoned on the basis of the capacity of the mills in the two zones. However, this figure of production can only be attained by means of importation of pulp. Soda pulp, which is not produced in the western zones, has been imported from Finland, Sweden, and from the Soviet zone.

In the French zone are situated the cellulose mill of the Zellstoffabrik Waldhof at Wangen and that of the Trickzelstoff G.M.B.H. at Kehl (Rhine). Moreover, some other pulp mills exist in conjunction with paper mills, for instance, those at Neustadt (Black Forest), Scheer (Wurtemberg), and at Baienfurt (Wurtemberg).

The pulp industry must supply cellulose not only to the paper industry, but the rayon industry, and some chemical works as well. These industries, like the paper mills, also complain of insufficient supply of cellulose. Even in the case of a further slow increase in the production of cellulose, a sufficient output can be obtained only when the mills are sufficiently supplied with coal, and above all with wood. By restricting the consumption of fuel wood (by means of a coal allotment to households), it might be possible to spare considerable quantities of wood for the manufacture of pulp.

The actual cellulose production in the western zones amounts to 4,000 tons a month, 400 tons of which are produced in the British zone, 2,500 tons in the U. S. zone, and 1,100 tons in the French zone. The production in the American zone is estimated at 6,000 tons a month.

The ten mills of the VVB-Zellstoff (association of the people's owned pulp works) in the Soviet zone have arranged a competition between their workers during the period from January 1 to June 30, 1949, as a contribution to the premature accomplishment of the "Two-Year Plan." All cellulose mills of the Soviet zone decided to take part in this race for an increase in production. These included the following works: Pirna, Heidenau, Crossen in Saxony; Merseburg in Saxony-Ashalt; and Wittenberge in Brandenburg. These works occupy a total of 9,600 workers.

British Paper Notes

(April, 1949)

▶▶▶ A FURTHER STAGE in the emancipation of the British paper trade was reached on April 24th, when national daily and weekly newspapers were allowed to increase their size from five to six pages daily. This is the greatest number of pages they have been permitted since the early days of the late war. Along with this announcement the government disclosed that old established journals, *i.e.*, those published before September, 1939, were to be allowed to have their quota increased by 50 per cent in July next. Such a large measure of increased quota is indicative of the improved material supply position. At the same time new journals, at present restricted to 2 cwt per month, are to have their quota doubled.

In short, the position has changed so rapidly that there is no practicable justification for the continuance of the Paper Control, at least as regards the rationing and licensing of paper. Also, in some quarters it is felt that if the purchase of materials was returned to the papermakers, the present high prices being paid for materials would break immediately, and it is anticipated that a fall in the prices of paper would follow naturally.

If any confirmation of this is needed, it is provided by the government's own figures, for it is disclosed that during the past year the Board of Trade made a profit of nearly £3,000,000 on the sale of papermaking materials. As present paper and board production is under 2,000,000 tons, obviously selling prices are at least 30/– per ton higher than they need be, and if added to this profit is the cost of maintaining the Paper Control, this excess price is proportionately higher.

Concurrently the economic drift is downhill. The general slowing of orders was at one time considered to be due to anticipation of the budget with its possible relief of purchase tax, which would have resulted in commodity sales reviving to a certain extent. The budget arrived and added further burdens, even if slight, to all classes. This additional drain on personal income can only result in further decline in sales.

Thus, the British paper trade, along with others, faces a difficult period ahead, which, unless a change of direction operates, will inevitably lead to stagnation.

The struggle for orders, both on the home and export side, is becoming more intense, and the weaker units of the trade are beginning to waver. Already stories of price easings are current, although as yet this is not in general operation. As the next six months might witness a drastic change, it is interesting at this juncture to review current domestic prices and make a comparison with these in the autumn. The coated qualities are covered by a convention price at 11¾d

lb, wood free quality M. F. and S. C. printing papers are listed at £66-12-6, the esparto qualities a trifle higher at £72-17-6, while M. G. poster papers are offered at £72-5-9 and newsprint round about £40 a ton. These prices are, generally, for ordinary substances and for up to two ton lots (the ton being 2,240 lb). Although these prices may appear to be high, it is just possible that home prices may be maintained in an effort to offset declining export prices.

Concern over the present price of newsprint was expressed by Sir Eric Bowater at the annual general meeting of the Bowater Paper Corporation, Ltd. He further stated that "there is today ample room for a reduction in the price charged by the government for raw materials, which I have reason to believe is generally substantially in excess of the price that the government pays for such raw materials. Furthermore, I hazard the opinion that there is also ample room for further reductions in the prices paid to the Scandinavian pulp mills for those raw materials, and I feel confident that, given a return to normal trading relations between producer and consumer, such reductions would quickly come about."

The almost complete change round in the British paper trade over the past few months is recorded in figures published in the *Board of Trade Journal*. Newsprint production, for example, in November reached 47 per cent of prewar, other printing papers moved up to 75 per cent, and the production of paperboards actually passed prewar by 15 per cent. In this respect, it is noted that during last year the consumption of wastepaper exceeded 1938 by 90,000 tons, yet stocks of wastepaper were maintained. Stocks of wood pulp improved considerably, and esparto grass imports surpassed prewar by a wide margin. Concurrently, straw for the production of paper declined from the peak of 300,000 tons during the war years to 100,000 tons in 1948. Against this, a significant trend has been the use of straw for the production of paperboards. This has increased from 30,000 to 60,000 tons, and there is little doubt that the use of straw, not only for boards but also for paper, is steadily increasing. As this is also operating in other countries, it is interesting to speculate if this will eventually affect the world wood pulp market.

In Great Britain we not only have the extra consumption just mentioned, but many other instances which are not revealed: One instance has just been published, that of the Olives Paper Mill, hitherto a wood free mill entirely; another, the straw pulping plant in Kent, which it was stated some months ago had reached five tons a day (all of which is going to a local mill making high class writings, a mill which could take additional supplies if they were available); and, further, the efforts of the Wallpaper Manufacturers Association to ensure their own raw material supplies (paper) by securing a straw pulping plant of their own.

Another move in the direction of home produced materials is the rather interesting and unusual report received from the Scottish Council. This mentioned the possibility of a wood pulp industry being set up in Scotland. Investigations have been in progress for some time, several sites have been suggested, and it is understood that the Forestry Commission will co-operate in the effort.

But what might delay all these efforts is the improved material supply position. During the first quarter of the present year papermaking materials have entered this country at the rate of 152 per cent of 1948. Imports of paper and boards are 128 per cent of last year and exports 163 per cent.

Over 10,000 tons more chemical wood pulp, dry, bleached, has arrived, and 26,000 tons dry, unbleached; while an additional 52,000 tons of mechanical pulp has been received. Esparto grass is now arriving at the rate of over a half million tons per year, against the prewar rate of approximately 300,000 tons, and the receipt of rags is much higher than prewar.

Receipts from Canada and Newfoundland are practically the same as in 1948, but Finland's exports to this country have risen from 55,274 to 73,659 tons, Sweden from 64,423 to 93,663 tons, and Norway from 20,866 to 65,605 tons. Total material receipts to date are 417,612 tons, which compares with 275,278 tons received during January-March, 1948. Among the export of paper and boards, it is noticed that the U. S. A. has taken 10,720 tons, compared with 477 tons during the first quarter of last year.

Although several mills in this country received bomb damage during the war, two only were completely or practically destroyed. One was the Broughton Bridge Mill at Manchester belonging to Messrs. Olive and Partington, Ltd. This was an M. G. mill with an appreciable tonnage output. The other was the New Merton Board Mills situated on the outskirts of London. While reconstruction of the former has not yet been started, the latter has been completely rebuilt and re-designed.

▼

Pulp and Paper Production in Kwangtung, China

The Kwangtung Provincial Paper Mill near Canton, China, the largest newsprint mill in prewar China, has been returned from Japan, and is expected to begin operating by the end of this year.

This $3,000,000 (U.S.) plant first began operations in China in July, 1938, but it was seized in October, 1938, by the Japanese when they invaded the Canton area. Later, the Japanese shipped the mill to Hokkaido, where it operated during the war years. A total of $1,000,000 (U.S.) will be required to cover the cost of transportation, re-erection, and replacement of damaged parts.

Before the war, the plant had a daily capacity of 50 metric tons (one metric ton = 2,204.6 pounds) of newsprint. The steady use of the plant by the Japanese in Hokkaido has worn the machinery to such an extent that some engineers believe the mill will produce no more than 42 tons of paper per day.

The reconstruction of this plant is a major element in the over-all rehabilitation of the paper industry in China, particularly if domestic production of adequate supplies of newsprint is to be assured. Three other small mills have been operating in Kwangtung. Their combined capacity is 13 tons per day, and equipment includes one fourdrinier and three cylinder-type machines.

The need for importing pulp from abroad for the Kwangtung mill can be eliminated only by providing pulp from local supplies of timber that are already inadequate to meet the fuel-supply problem. Therefore, it will be difficult for this project to operate whether economically or satisfactorily until extensive hydroelectric development is provided. (From *Foreign Commerce Weekly*)

▼

New Wallboard Mill in South Africa

A wallboard mill expected to produce about 60,000,000 sq ft of hardboard and insulation board annually was formally opened at Estcourt, Natal, Union of South Africa, on April 2, 1949.

The mill, which took two years to build, was first started in 1942, but was postponed until after the war. The plant occupies about 57 acres and was constructed at a cost of £1,250,000 (1 South African pound = about $4.00-U.S.). The enterprise was financed jointly by South African investors, the Industrial Development Corporation (a South African organization similar to the Reconstruction Finance Corporation in the United States), and a parent company in the U. S.

The principal raw material used will be waste wattle wood, left after the bark has been used for tanning extracts. About 60,000 metric tons (1 metric ton = 2,204.6 pounds) are expected to be available per year from the wattle industry. Inasmuch as this wood can be purchased by the wallboard mill for approximately 25 shillings per ton (about $5.00-U.S.), the cost of this raw material will be very low. About 150 Europeans and 200 natives will be employed in the plant.

It has been estimated that the factory will save the Union of South Africa about £1,000,000 per year in imports of hardboard and insulating board. (From *Foreign Commerce Weekly*).

▼

From Australia

Australian Newsprint Mills Pty. Ltd.—Delivery of this company's second paper machine, part of its expansion program, is proceeding about on schedule. This machine is being built by the Dominion Engineering Company of Canada. Because of circumstances, it is not at this writing possible to forecast the exact date this second machine will go into production.

Paper Industry for New Zealand—The Commissioner for State Forests in New Zealand has announced that the New Zealand government has decided to establish a large-scale pulp and paper industry, mainly for the production of newsprint near Whakatane in the North Island.

Investigations into the possibility of New Zealand being able to establish a pulp and paper industry have been carried out for many months, and reports in favor of this movement have been received from W. H. Rambo, consulting engineer, Portland, Oregon, and from representatives of the Rust Engineering Company, who visited New Zealand some time ago.

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Foreign Abstracts . . . . . .

Nitric Acid in Pulp Manufacture

In order to determine what conditions are best suited to nitric acid pulping and which affect cellulose least adversely, the author subjected surgical cotton (containing 98.7% alpha-cellulose, and showing a copper number of 0.01) to the following treatments: (A) 40% nitric acid at 14 C for 3, 6, and 12 hours; (B) 5% nitric acid at 100 deg for 2 hours; and (C) 20% nitric acid at 80 deg for 1 hour. In all cases, the acid treatment was followed by soaking 4 hours in 1% caustic soda solution at 20 deg and washing. The results are given in Table 1, and favor method (A).

When the three methods were applied to wheat straw, and the nitric acid pulps were compared with two commercial straw pulps made in England and France by the usual "classical" procedures, the results given in Table 2 were obtained. It is evident that method (A) gives a strong pulp in good yield. However, if the temperature of (A) is increased from 14 deg to 35 deg, straw pulp yields and quality suffer greatly. The results of the present author confirm those of previous investigators (like Aronovsky *et al*). The methods of maintaining low temperatures and of recovering nitric acid are discussed at some length. P. Delcroix. *Bull. assoc. tech. Ind. papetiere* 3, 32-7, 1949 (In French).

TABLE 1

	(A) 3 hrs	(A) 6 hrs	(A) 12 hrs	(B)	(C)
Yield (per cent)	98.7	96.5	95.6	91.7	92.6
Per cent alpha-cellulose in residual pulp	96.8	97.4	97.1	91.5	87.2
Copper No.	0.03	0.07	0.10	2.10	2.79

TABLE 2

	Controls with commercial straw pulps made in		(A)	(B)	(C)
	France	England	6 hours	2 hours	1 hour
Yield (per cent)	.....	.....	51	39	44
Cellulose content	71.5	71.5	83	85	79
Burst	31.3	17.8	40	28.3	32
Breaking length (meters)	5747	2922	7000	6217	5520
Per cent elongation	3.5	3.5	3.5	2.2	2.2

Laboratory Screening Studies at Darmstadt, Germany

Previously, the authors discussed the screening operation from a theoretical standpoint (cf. *Papier-Fabr./Wochbl. Papier fabr.* (1944) 259-68) but in the present papers they supply extensive experimental data on the wet (or fine) screening of pulps. In the case of a flat screen, the dimensions were 960 x 175 mm. (with a total surface area of 0.168 sq meters). Four interchangeable screens were used. Three of these were equipped with slits 5 mm. long, but having various (slit) widths (0.2, 0.3, and 0.4 mm). The actual screening area of these screens were (A) 14.4%, (B) 19.6% and (C) 26.2% respectively of the total screen surface. The fourth sceen (D) had symmetrically placed round holes, 1 mm in diameter and the actual screening area was 22.3% of the screen surface.

Efficiency was at its peak, when the pulp suspension covered the screen to a height of about 3-4 mm, wih pulp fibers flowing parallel to the plane of the screen and oriented longitudinally to the direction of the flow. The lower the pulp charge, the greater was the screening efficiency, and this efficiency dropped rapidly with rising pulp

charge. Unfortunately, the retention of impurities (expressed in terms of those originally present in the pulp versus those passing the screen) was *least* effective when the pulp charge was low rather than high. This would mean that in the case of high screening efficiency, there is a concomitant passage of a relatively high per cent impurities (with resulting dirty stock).

The true efficiency thus depends on the nature and quality of the original pulp. Groundwood is screened more effectively than is chemical pulp. This is due to the smaller average particle size of the former. Usually, mechanical pulp is freed more easily from impurities than is chemical pulp. Screen (A) under nearly all experimental conditions gave a sliver-free pulp. The screening efficiency increased with the rate of shaking and with decreasing consistency of the stock suspension. Screens (B) and (C), while permitting freer passage of the pulp, also allowed more slivers to pass the screen. In such cases a higher consistency helped in the more effective removal of slivers. In screening mechanical pulp, screen (D) was the least effective, especially when stock densities were low. However, screen (D) was far better in the removal of slivers than were (B) and (C). When chemical pulps were to be screened, no improvement was noted by increasing slit widths, and (D) was least effective. (D), however, was most effective in retaining the larger slivers of groundwood. The impurities present in chemical pulp are seldom greater than are the fibers themselves. The generally higher effectiveness of (C) over (D) is discussed quite fully. In flat screens, round holes (as in screen D) are only advantageous when the dimensions of a pulp impurity are greater than are those of the pulps to be screened.

The following techniques are suggested (in the case of groundwood) for increasing the efficiency of screening:—a screen of type (D) is used first to remove slivers, and this is then followed by the use of a suitable slitted screen. Future experiments as well as the limitations of the experimental data are discussed. The authors give 21 graphs. In a subsequent article, the same authors discuss the use of a *revolving screen* (instead of the flat screen) which is described in detail. Comparative data are given for both types of screens, using the same mechanical pulp. The influence of variables are discussed at length in this paper as well. 1st paper—W. Brecht and H. Schröter *Wochbl. Papierfabr.* 75, 67-3; 88-92 (1947); 2nd paper—*Ibid* 76, 261-67; 291-6 (1948). (In German.)

"Hardness" of Pulps

Pulps were prepared by heating spruce chips (of varying sizes) with aqueous sodium bisulphite (containing 2.2% free and 1.8% combined sulphur dioxide) at 100 C over a period of about 18 days (changing the cooking liquor every fourth day). The chip thickness in three series were 2-3 mm, 1-2 mm. and $\times$ 1 mm. At the end of this time period, the pulp yields were about 52%, and the lignin content had dropped from about 28% (of the original wood) to 0.3%. However, this pulp resisted defibering. Hydration in a Lampén mill proved difficult (especially in the case of those pulps prepared from chips under 1 mm in thickness). Pulps (prepared from the same wood under normal sulphite cooking conditions) retaining respectively 5.2% and 8.9% lignin could be hydrated just as readily (or more readily) than could the lignin-free pulps mentioned above. Semichemical pulps (obtained in about 75% yield) also were prepared from two different samples of sprucewood. These retained respectively 14.1 and 15.9% lignin and were very resistant to hydration. However, when these same pulps were carefully delignified with chlorine dioxide, the rate of hydration in the resultant product increased, and in the case of one pulp, all the strength properties also increased sharply. In the other (chlorited) pulp, the folding endurance showed a decided increase whereas none of the other strength properties decreased. When too high a proportion of low molecular weight polyoses is present in a pulp (i.e. in a holocellulose) the hydration is also interfered with. Under such conditions, the fibers are "stiff" and photomicrographs show that they adhere closely to each other. Only by using a Turmix apparatus could effective hydration be obtained in such cases. Mild alkaline or hypochlorite treatment which removes a part of the surface layer from the holocellulose also results in a pulp that is easily beaten and develops improved strength properties. This is shown in the above table.

HOLOCELLULOSE

Pulp Properties	I Not treated further excepting for processing in a Lampén mill (11,000 revolutions)	II Treated with hypochlorite at 35°, then processed in a Lampén mill (11,000 revolutions)	III Treated with 0.05% NaOH (5% alkali on the basis of holocellulose), then processed in a Lampén mill (11,000 revolutions)
Yield	100%	97%	95%
Freeness; Schopper-Riegler	10°	47°	76°
Breaking length	9200 m	13,300 m	11,500 m
Burst (kg/cm²)	3.7	6.9	5.6
Double folds	700	3700	4000
Tear	54	43	40
Mean fiber length	2.58 mm	2.12 mm	.....

Fibers obtained by using an Asplund defibrator also were converted into "chlorite holocellulose" (yield 67% with 2.4% lignin). This material could be processed in a Lampén mill to 44 deg. S.R. giving a pulp with good strength properties thus indicating that the Asplund process (carried out at 170 deg.) attacks the fiber surfaces sufficiently to permit adequate hydration of the pulp after delignification. In summing up their results, the authors state that the ease of hydration (or defibering) of a pulp cannot be gauged simply by its lignin content. On the other hand, the percentage of the polyoses (hemicelluloses of low molecular weight) is very important in affecting pulp quality. When these polyoses are selectively removed (as in the case of a slow but thorough delignification at 100 C with very thin chips) hydration and pulp quality may be affected adversely. In other words, hemicelluloses of higher D.P. (i.e. those approaching the molecular dimensions of cellulose) do not contribute greatly to the hydration of the pulp. When large amounts of lignin are left in the pulp so that the lignin covers or protects the polyoses of low D.P., the resulting pulp is also very difficult to beat. However, as soon as this lignin is removed by chlorite, hydration is accelerated. The authors discuss their findings at some length. Chain length distribution studies of the carbohydrates in one of the chlorited pulps also were made, and shown graphically. 15 References. Erik Hägglund and Barbro Webjörn *Svensk Papperstidn.* 52, No. 6, 131-7 (1949). (In German with Swedish and English summaries)

Possible Uses of the Spiral Dryer

The author suggests that the spiral drier used successfully for many years in the textile industry, but little known in papermaking, may find an application in the manufacture of photographic papers or of varnished papers in which the coating material is dispersed in volatile solvents.

The construction of the drier is shown in drawings and its operation is described briefly. *Papeterie* 70, No. 9 289-91 (1948) (In French).

Test Showing Suitability of Pulps for Acetate Manufacture

The method described by the authors serves quantitatively to establish the reactivity of various pulps towards an acetylation mixture. Instead of the protracted treatment at 90 degrees previously described (cf. Jayme and Schenck, *Cellulosechemie 22*, No. 2, 54-6 1944), the rasped pulp is treated for ten minutes with glacial acetic acid at room temperature. As previously described, the activated residue is then acetylated with a mixture of acetic acid, sulphuric acid, and acetic anhydride under carefully standardized conditions. Turbidity measurements are made immediately after treatment and again after centrifuging for five and for twenty minutes. The drop in turbidity is then computed, and the undissolved residue is also determined.

This technique permits a rapid evaluation of the pulp as a raw material for subsequent acetylation. For example, if (as in the case of a beechwood sulphite pulp) the turbidity values and the insoluable residues obtained in the test are both low, the pulp is a satisfactory raw material. If on the other hand a pulp shows a high residue (both after acetic acid pretreatment at room temperature and at 90° C), and the final turbidity value is high, it is unsatisfactory.

The authors give tabulated data showing the effect of long and short pretreatments with acetic acid in the case of eight dissolving pulps. G. Jayme and V. Schenck. *Angew. Chem.*. 60 A. No. 2, 46-7 (1948) (In German).

Sulphite Pulp Bleaching

The progress made in bleaching sulphite pulp is discussed from the standpoint of the unbleached material, bleaching agents, process water, bleaching operations, and equipment. Multistage bleaching, in which various combinations and sequences are used is also described. A normal sulphite pulp can be bleached satisfactorily and it is possible (due to the advent of newer bleaching agents) to produce pulp for special purposes. Chlorine dioxide for technical purposes is a new development, and special attention has been given to removing residual lignin under mild conditions so as to obviate degradation of the cellulose. This residual lignin is non-homogeneous and consists of components showing very varying solubilities. A great saving of chlorine may be effected provided the more slightly condensed (*i.e.* the more readily soluble) lignin fractions are removed first by the addition of small amounts of oxidants (such as hypochlorite) prior to the actual chlorination. This is especially applicable in the case of strong pulps, in which such lightly condensed lignin appears to predominate. Inasmuch as the use requirements of chemical pulps for various specific purposes are now more completely understood, it becomes possible to determine how such pulps should be produced and what bleaching processes are best applied. Kurt af Schulten. *Svensk Papperstidn.* 52, 33-40 (Jan. 31, 1949) (In Swedish with English and German summaries).

Chemical Differences Within an Individual Bole in Aspen Woods

The wood was taken from different sections (butt, middle of bole, crown) of an individual tree trunk in each of three selected specimens of *Populus serotina* (I), *P. robusta* (II), and *P. trichocarpa* (III). In all cases the pentosan, ash, and cellulose contents decreased progressively from butt to crown. Sulphate pulp yields also decreased and methanol-benzene extractives increased markedly. No clear cut progressive changes in lignin content were noted. The extreme difference in sulphate pulp yields carried out under carefully standardized conditions ranged from 1.26 to 4.31%. No progressive or marked changes in wood density were found except in the case of III, in which the density decreased (towards the crown) in the sapwood, but rose (towards the crown) in the heartwood. Outer and inner bark content was lowest in the middle of the bole. Furthermore, the "bark content" was markedly higher in the case of a ten-year-old poplar than in a thirty-year-old specimen.

A well-grown trunk of II selected from the same site on which grew a poorly developed specimen of I showed a somewhat higher cellulose content than did I. On the other hand, specimens of I are fully capable, even after only ten years when grown on a suitable site, of producing higher cellulose yields, than do specimens of II (for the same growth period) even when the former were grown in close proximity to each other. When, however, forest management is not practiced and trees thinned, "light-hunger" will cause marked growth inhibitions with concomitant lowering of the cellulose content. Species, site and surrounding regions influence the chemical composition of the wood.

The standardized kraft cook was carried out as follows: 100 grams of wood (calculated on the dry basis) were treated with 750 cc liquor (containing 2% "sodium" of which 65% was present as sodium hydroxide, 20% as sodium carbonate and 15% was in the form of sodium sulphide). The heating to 155 C required two hours. This temperature was maintained four hours and cooling to 110 deg required one hour. This standard cook when applied to beech gave *ca.* 53% yields (somewhat lower than those usually obtained from aspen) and these cooking conditions failed to pulp spruce adequately (since this wood required a maximum temperature of 170 deg and a three-hour period at this temperature). Under these more drastic conditions, the spruce pulp yield was 49.4%. Despite slight cellulose differences in various parts of the bole, the overall yields from well grown aspen wood are entirely satisfactory. Georg Jayme, Udo Schenck and Ludwig Rothamel. *Das Papier* 3, 1-7 1949 (In German).

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Rating a Lift Truck*

MILTON SMITH and HARRY MEISTER
Lift Truck Designers
Hyster Company

▶▶▶ SINCE LIFT TRUCKS are made in many different sizes, arbitrary capacity ratings are assigned to differentiate between models. The manufacturer's rating can serve only as guide to the proper selection of a lift truck for a certain job. The rating does not tell the prospective owner whether the truck will tip forward when the brakes are applied, or how it will work on steep ramps or over rough ground.

We are concerned here only with the fork-type lift truck on which the load is carried ahead of the front axle.

With the load carried ahead of the front axle, it is necessary to provide a counterweight at the rear of sufficient size to counterbalance the load, to assure stability for sudden stops, and to maintain enough weight on the rear tires for steering. It is not easy to determine how much counterweight should be used. A high safety factor against tipping will overload the rear tires. Half of the time there will be no load on the forks and the entire counterweight load will be on the rear axle, imposing a maximum load on the tires and greatly increasing the required steering force.

Several other factors influence the amount of counterweight used. In order to keep the overall dimensions of the truck to a minimum, the designer is tempted to stack the counterweight up high. While he can achieve a high tipping safety factor in this way, the center of gravity is so high that the truck will tip when the brakes are applied. The prospective customer should examine this feature which is never apparent in the rating specifications, although the ratio of rated load to tipping load may be given.

The term tipping ratio is as good as any to designate the ratio between the load for which the truck is rated, and the load which, under static conditions, will cause the truck to tip.

Most trucks are rated between 60 and 80

*Abridged from article in *Lifts* (Jan., 1949), published by Hyster Co.

FIGURE 1
LOADING CURVES
FOR A 4000LB. PNEUMATIC TIRE LIFT TRUCK

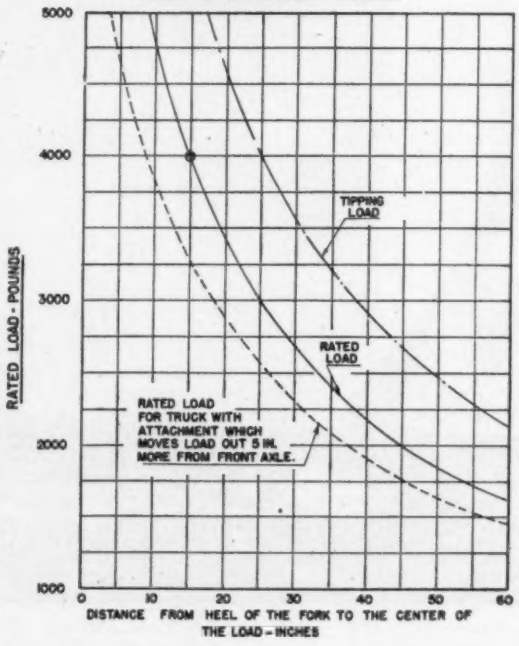
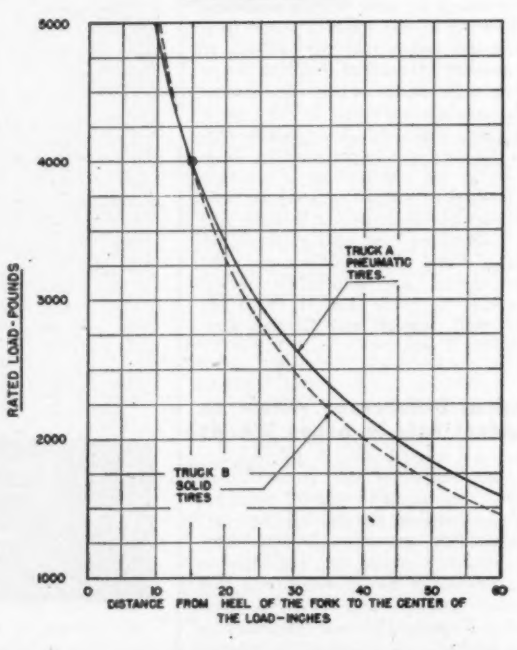


FIGURE 3
RATED LOADING CURVES



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per cent of tipping. The ratio required depends on the job the truck must perform. For fragile or costly loads the ratio should be lower (further from tipping load) than when handling bales of cotton. If speeds are kept low by safety rules, the ratio can be higher (nearer tipping load) than for "highball" operations. Where the ground is rough or where loads must go down ramps, it is well to keep the ratio low. Flat, compact loads are safer to handle than high loads as the high center of gravity causes tipping when the brakes are applied.

Most manufacturers rate their lift trucks on either 15-inch or 24-inch load centers, 30-inch or 48-inch forks. Most ratings are based on a standard nine-foot lift height. Any weight added ahead of the front axle by the installation of various attachments is sure to change either the rating, the tipping ratio or both. Extra mast height adds weight ahead of the axle and raises the center of gravity.

FIGURE 2

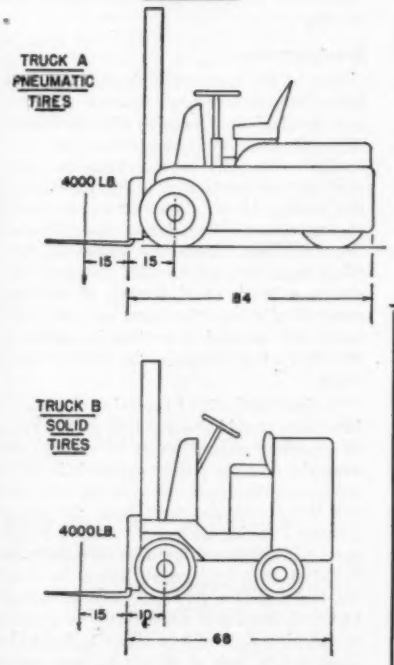


Figure 1 illustrates the difference between the tipping load and the rated load on a standard truck. The broken lines show what happens when an attachment is added.

From the designer's viewpoint the most important dimension on a lift truck is the dimension from the front axle to the heel, or vertical face, of the forks as indicated in Figure 2. Figure 3 shows how a small increase in this dimension will decrease the load-carrying capacity by moving the load farther from the axle. It soon becomes obvious why so many trucks have very small wheels with solid tires.

When designing a new truck, the engineer chooses the tire size before anything else. The larger the tire diameter, the smoother it will roll over uneven surfaces and the better the traction characteristics. Next he crowds the apron, which carries the forks, as close to the tires as he dares. Now, knowing the rating he wants, e.g., 2,000 pounds at 15 inches, he can determine the inch-pound rating around the front axle. If this is divided by the approximate tipping ratio needed, he has the tipping moment about the axle, and begins to have a good idea of how much counterweight will be required and how much the truck will weigh.

Generally speaking, of several trucks with the same rating, the one with the smallest tires will be the smallest, lightest, and probably the cheapest to build. This is due, not so much to the space occupied by the wheels, as to the increased moment on the axle when the load is moved forward to clear the tires.

Let us now examine the term rated load. Generally it means the maximum load which the truck is designed to carry when operating on hard, smooth pavement. The center distance, or distance from the edge of the load to its center of gravity, refers to the maximum distance out along the fork at which that load can be carried without increasing the tipping ratio beyond the point considered safe by the designer.

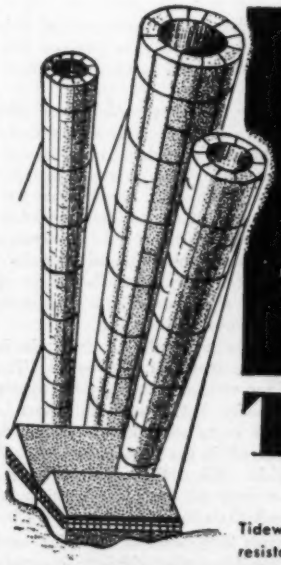
Reference is sometimes made to inch-pound rating as a method of describing capacity. By this term we mean the moment about the front axle which is produced when rated load is placed at rated center distance on the forks. In other words, the sum of the rated center distance and the distance from the heel of the forks to the center of the front axle, multiplied by the rated load, equals the inch-pound rating.

The trouble here is that the manufacturer's literature often fails to give the distance from the heel of the forks to the axle. However, if this distance and the *inch-pound rating* are known, it is easy to calculate the load than can be safely carried at any distance out on the forks beyond the manufacturer's rated center distance. For any distance less than that the maximum safe load cannot be more than the rated load.

A common misconception is that the hydraulic system limits the load that can be lifted. Actually the horsepower required for lifting is often less than 10 per cent of the rated engine horsepower, and it would be a simple matter to provide a larger hydraulic system.

Limitation in tire capacity is the real problem facing the designer. The front tires are always heavily loaded when the truck is working at capacity. When the truck is traveling empty, the rear tires are loaded to full capacity by the heavy counterweight. When the tire manufacturers have found a way to build small diameter tires, both solids and pneumatics, which will withstand heavier loads, then it will be possible to build smaller trucks of greater capacity.

At present there is no standardized method of designating lift truck ratings. When we consider that the industry is comparatively new, it seems remarkable that there is as much similarity as we now have between the methods of the various manufacturers. While we believe that standardization can be carried too far, we do think that the methods of describing capacities, the terms used, should be standardized throughout the industry.



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The Champion Process for Machine Coating*

J. R. SIMPSON
Champion Paper and Fibre Company

The Champion process consists of applying an excess of coating to the surface of the sheet by means of a roll revolving in a trough of coating mix, thus building into the surface a filter cake of coating, the excess coating being then removed by means of a specially constructed wiping blade or revolving rod.

In order to properly accomplish this wiping process the sheet must leave the wiping blade at the proper angle and with sufficient tension to assure a smooth wiping action and a uniform application of coating to the surface.

After coating, the sheet must be passed around at least one dryer with the dry side against the hot surface and the newly coated side out. This allows the coating to become dry enough to prevent sticking when it comes in contact with the hot dryer surface.

Equipment Development

It is easy to recall the crudeness of design of each piece of equipment used in our first installations in 1938 and I am sometimes amazed that it ever worked—but it did.

While the fundamental principle of the process itself has not changed, there have been many changes and improvements made in the design, especially to the coating preparation and supply equipment. A number of these improvements were made through the co-operation of the Black and Clawson shops and engineering staff with the result that we now have a process which is comparatively easy to install and operate.

In describing the various pieces of equipment, let's start at the coating preparation and finish with the coaters. In my description of the process it is necessary, for obvious reasons, to avoid disclosure of any confidential data as to formulas, etc.

First, an automatic water meter measures the required amounts of water into the adhesive cooker and the clay mixer merely by setting the gauge and opening the valve. When the desired amount has been delivered the valve automatically shuts off. On all recent installations the cookers, mixers and storage tanks have been made of stainless steel.

The adhesive cooker is designed for indirect heating with a steam jacket, and is usually built with a capacity of 400 gallons. It is equipped with a specially designed agitator rotating at 30 rph.

The 600 gallon clay mixer is a round bottom tank having a high speed agitator of special design and is capable of mixing clay thoroughly at from 65 per cent to 70 per cent solids.

After the adhesive has been cooked it is either dropped by gravity or pumped into the clay suspension and agitated until thoroughly mixed.

The mixture is then passed through the primary screen into the coater supply tanks which are usually placed in the basement, whenever possible. The supply tanks are also equipped with slow speed mixers to prevent formation of a crust on the surface or settling of the coating within the storage tanks. Too much agitation will produce froth, which is always a potential source of trouble in a coating operation. Thus exessive agitation must be avoided.

From storage tanks the coating mix is pumped to the center of the coaters. The overflow from each end returns to the supply tanks, by gravity, if the tanks are placed in the basement, or to an automatic float tank in the dryer pit in the event a basement is not available. When the overflow is collected in a dryer pit tank it must then be pumped back to the supply tanks.

The pumps in general use are of a semi positive centrifugal type which have proven very satisfactory. However, positive type pumps can be used with a suitable piping arrangement.

The location of the coaters on the paper machine requires experience and good judgment and depends to a large extent on the grades to be coated, speed of the machine, breaks in the dryer section, number of dryers available, etc. It is advisable to have the coaters located between dryer sections, thus providing a draw adjustment at the coater to control the tension of the sheet over the coater.

The moisture content of the sheet at these stations will vary, depending on the dryer layout. However, as an overall statement, the paper is usually around 50 to 55 per cent dry at the first coater and from 60 to 65 per cent dry at the second coater.

On book or similar grades where both sides are coated, the wire or bottom side is coated first, then, after passing over six or eight dryers the felt or top side is coated, followed by sufficient dryers to complete the drying operation before passing to the machine calenders.

When coating boxboard, or similar grades, two or more applications to the liner side of the sheet usually give the best results, the reason being that these grades normally have a rougher surface and a higher porosity than book paper. The additional applications enhance the appearance and printability of this particular type of sheet. However, many thousands of tons of single coated board have been produced with satisfactory results.

Improvements

One of the most useful improvements in the process is the break detector, which is now standard equipment on all installations. Without this equipment, when the web breaks or for any other reason the sheet slackens sufficiently to lose its tension over the wiping blade, the resulting excess of coating causes a smearing of the following dryer surfaces. With the automatic electrical break detector installed ahead of each coater, a break or slackening of the web automatically stops the coater roll. With the coater roll stopped no coating is applied to the sheet. Consequently, the dryers remain clean.

Various methods of bypassing the coaters have been provided depending on the types of machines and grades to be coated. For example, on light weight papers it is rather a simple matter to install a swing or stretch roll which lifts the sheet from the coaters without breaking the paper. A light weight sheet with high moisture content usually has sufficient stretch to permit this to be done. On board grades, however, another scheme had to be developed since the use of a swing or stretch roll, would be likely to break the sheet due to lack of stretch in these heavy weights. The method used for board is to lift the coater assembly slowly to the sheet by means of a motor, cross shaft, reduction gears and screws. When the mechanism has been raised to the operating position with the paper leaving at the proper angle over the wiping blade, the coater roll is started and the sheet is then being coated. To bypass the coater, this operation is reversed, the assembly being lowered to a position approximately two inches from the sheet.

Mention has already been made of book and board grades having successfully been produced by the Champion process. In addition, there are installations coating bread wrapper, rotogravure, bag paper and display blanks.

There are now 26 installations in operation with 14 pending, which means a considerable amount of business for machine builders. In view of the constantly increasing demand for better surfaces on which to

*Abridgment of lecture presented at the Black-Clawson, Shartle, Dilts Lecture Course on March 22, 1949.

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Champion Coater Installations Now in Production

Name	Address	Installations	Grade	Name	Address	Installations	Grade
Australian Paper Mfgs., Ltd.	Sydney, Australia	(1)	Board	Fibreboard Products, Inc.	Los Angeles, Cal.	(1)	Board
Badger Paper Co., Inc.	Peshtigo, Wis.	(1)	Br. Wrap	Fort Orange Paper Co.	Castleton, N. Y.	(1)	Board
Beveridge Paper Co.	Indianapolis, Ind.	(2)	Blanks	Galloway Paper Co., Ltd.	Balerno, Scotland	(1)	Book
Bartgis Bros. Co.	Ilchester, Md.	(1)	Board	Mac-Sim-Bar Paper Co.	Otsego, Mich.	(1)	Board
Chase Bag Co.	Chagrin Falls, Ohio	(1)	Bag	New Haven Pulp & Board Co.	New Haven, Conn.	(1)	Board
Continental Paper Co.	Ridgefield Park, N. J.	(1)	Board	New York & Penn. Co.	Johnsonburg, Pa.	(1)	Book
Container Corp. of America	Wabash, Ind.	(1)	Board	Ohio Boxboard Co.	Rittman, Ohio	(3)	Board
Cornell Wood Products Co.	Cornell, Wis.	(1)	Board	Papeteries Navarre Ltd.	Roanne, France	(1)	Book
Cutler Paper Mills Ltd.	Aberdeen, Scotland	(1)	Book	Provincial Paper Ltd.	Port Arthur, Ont.	(2)	Roto
Empire Box Corp.	Stroudsburg, Pa.	(1)	Board	Sutherland Paper Co.	Kalamazoo, Mich.	(2)	Board

*This list does not include the installations in Champion Paper & Fibre Co. Mills at Hamilton, Ohio and Houston, Texas.

Mills Awaiting Delivery of Equipment

Assoc. Pulp & Paper Mills, Ltd.	Burnie, Tasmania	(1)	Book	Lemor Corp.	Paterson, N. J.	(1)	Board
Container Corp. of America	Wabash, Ind.	(1)	Board	Tennessee Corp.	Chattanooga, Tenn.	(1)	Board
Container Corp. of America	Manayunk, Pa.	(2)	Board	Titaghur Paper Mills, Ltd.	Calcutta, India	(1)	Book
Cutler Paper Mills, Ltd.	Aberdeen, Scotland	(1)	Book	Townsend Paper Mills, Ltd.	Snodland, England	(1)	Book
Donside Paper Mills, Ltd.	Aberdeen, Scotland	(1)	Book	Westfield Paper Mills, Ltd.	Westfield, Scotland	(1)	Book

print, it would seem that our job has just begun.

In the search for better printing surfaces we have made a distinct improvement with our installations on board machines. Reference is made particularly to those installations where water cooled smoothing rolls have been placed directly ahead of one or more of the coaters. The resultant sheet has been most satisfactory.

In conclusion, I wish to again emphasize the importance of better surfaces on which to print. The printing trade demands these improvements and with the present outlook of paper market, this condition is liable to prevail for some time to come. This is a challenge not only to the papermaker and the coating man but also to the paper machine builder and designer, to build paper machines capable of producing paper and board having good formation with a minimum of felt and wire impressions. The fact remains that the printing surface of both coated and uncoated grades is materially affected by the formation and surface of the base sheet.

Felts and Their Relation to Paper Machine Problems*

L. M. WOODSIDE
Albany Felt Company

There are three major, or basic, characteristics which a felt must have. One or two of these characteristics may be more important in one operation than in another, but all are still of importance. These three characteristics are: Openness, Finish, and Strength. Every felt must be open enough to do the job efficiently; it must be fine enough to give satisfactory finish, and it must be strong enough to run on your machine without stretching and bagging.

The problem is to get the proper balance among these three factors. The best way to illustrate this is to imagine each of these characteristics as one leg of an equilateral triangle, as each is of equal importance in the manufacture of a satisfactory felt for any machine.

You can see that if one leg of the triangle is changed, the shape of the triangle is altered unless some change is made in the other two legs. By the same token, if we change a felt design to increase the strength, we will also change either the openness, the finish or both.

That is the reason that we have felt designers and service men. We are usually able to determine how much we should alter a design to meet conditions and to make a change in one factor in such a way that it will not affect the other two factors too much. Or we can alter the other two legs of the triangle so the resulting felt will give improved finish, for instance, and will still have satisfactory openness and strength.

The point I wish to impress upon you is that when you ask for greater strength, better finish and more openness, all at the same time, you are asking for something which cannot be done. We can improve one or two of these items, but usually at the sacrifice of another. From all this you can see why we term a felt a compromise. We must compromise between strength, finish and openness, to give you a felt which will do your particular job best.

I have had many cases where we have been asked to do something more with a felt than can be done with the felt alone. To illustrate I will tell you of one board machine with which I have had experience over the past few years. This particular machine was making a white-lined, machine-coated sheet. They wanted better finish and greater openness. It developed that we were making a felt which was as open as we could make, commensurate with the fineness and strength required.

It was found that the primaries were in such poor condition that they were pressing very unevenly across the machine. When these primaries were properly ground, it was found that they had no more trouble with filled up spots, and we were able to go to a finer felt to give them the finish they required, without making the felt too close for good operation.

Since a felt must be a compromise of three different things, it is obvious that no one can reach in the air, pick out a felt design, and say that it will operate well on your machine. In the past, the felt companies believed that if a felt worked on one machine making a certain grade of paper then that felt could be applied to other machines making the same grades at approximately the same speed. During recent years this has been found to be untrue. Almost always each position on each paper machine in the country is different enough so that a small difference in felt construction is necessary. This can be true even for two machines exactly alike running the same stock from the same machine chest.

In view of this, it is necessary that your felt company representative and your mill superintendent or operators work very closely together. It is through this close cooperation that we are able to give to you the benefits of our experience and to give you a felt which will operate well under conditions that are sometimes very difficult.

There is another point I would like to

(*) Abridgment of address given before the Michigan Division of the American Pulp and Paper Mill Superintendents Association, Kalamazoo, Mich., March 17, 1949.

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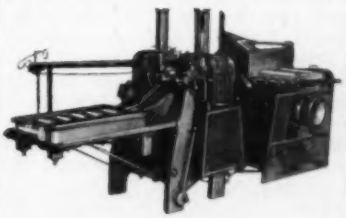

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explain, and if you have any question about it please do not hesitate to ask during our discussion period. That is the size of a felt. The ordered size in a felt is not as definite as the ordered size of something like a piece of shafting or some other machine part. The operating size of a felt is affected by a number of factors.

Let us suppose you ordered felts from three suppliers in a size 50 ft by 150 in. You might find that one felt was too short and wide, the second was long and narrow while the third was somewhere in between. That does not mean that each supplier made a different size felt. It simply means that each supplier made a felt of a different basic construction which acted differently on your machine. In the first case, the felt was stronger than required so it shrank short and wide. The pull on the machine was not sufficient to pull the felt out near its ordered length, so it remained wide. In the second case the felt was not strong enough so it stretched and became narrow.

When you are ordering a felt for a new machine or from a new supplier, you should give the width of the press rolls, and, in the case of a cylinder machine, the width of the cylinders. You should also tell him the maximum and minimum length, as measured with the stretch roll at the two ends of the jack. Then it is up to the felt supplier to make a felt to run correctly on that position.

There is another point on which I am sure all the felt makers will agree. When you build or rebuild a machine and determine the felt sizes, please do not change specifications affecting the felt travel without notifying the felt maker. I have seen probably 20 such machines since the war which have started up, and on not over four of them were the felts the right size. In checking back to the blueprints and then measuring the felts it was found that in practically every case, some change had been made in the felt travel which added to or reduced the length. In some cases it was found they could not use the felts made up without making emergency machine changes.

There is one more question I should like to discuss. That is the amount of felt stretch there should be on any position on a paper machine. On all except bottom felts on board machines, the total over-all stretch will seldom if ever exceed two feet. On board machine bottom felts, however, the stretch over-all—that is the difference between the maximum length of the felt at the longest point and the minimum length at the slack point—will run four, six or even eight feet.

I have often been asked what I would consider to be a normal stretch on a board machine bottom felt. This cannot be answered directly as the normal stretch must always be considered in relation to the length at which the felt is manufactured.

Let us take for example a bottom felt made 150 ft long. If the maximum length of this felt does not exceed 149 or 150 ft, as much as eight ft of stretch uniformly distributed over the machine should not be harmful. With the same felt, however, if the maximum length of the felt is 152 ft or more, then only two feet of stretch is too much. In the latter case the felt has gone beyond its manufactured length. It is approaching the point at which there is liable to be trouble. The felt must necessarily be tight, which means that any foreign material going through the machine is likely to puncture it. Also, it is probably not strong enough to pull the various units of the machine.

If I were to give you a figure of stretch on a felt which is more or less normal I would say that the stretch should not exceed four to six feet. Now many machines are built where the stretch is considerably less than that because of the fact that the machines have several driven units. But when I suggest that the stretch should not exceed four to six feet I mean that the longest length of the felt should be less than the manufactured length.

If the stretch or maximum length is less than the manufactured length then it indicates that the felt still has "come-back-ability" or elasticity which allows it to take the load of the running machine and still come back to a good short length after the load is released. It is this "working" of the felt or "breathing" which helps keep the felt from filling up. And a clean felt of course performs better.

There is much that can be done by you to improve your felt operation. Probably the most frequent cause of removal of fourdrinier felts, for example, is filling up of the felts. I believe that more fourdrinier felts are removed from machines because they are filled up than for any other reason. This should probably be blamed on the clay people and other manufacturers of fillers which you use, but the blame is frequently placed on the felt maker. I am sure that all of you will agree that the best way to keep a felt clean is not to allow it to fill up. There are several ways of doing this. There are several felt conditioners on the market which do a good job.

The Vickery conditioner, the Schofield felt conditioner, and the Dowingtown suction felt roll are the best known and probably the most used. These conditioners when properly used do a satisfactory job of cleaning felts.

There are other things which you can do to keep your felts clean. In certain cases, the use of a suction box coupled with a shower of cold or warm water will materially help in keeping felts clean.

Wormed rolls and spread rolls can be used. In years past, felt companies have made a point of advising against wormed rolls or spread rolls on the basis that they help to wear felts out. I will not argue that point. However, is it not better to wear a felt out and get good production from it than either to slow your machine down or to remove a felt because it is filled up? I think it is. In fact I would go so far as to say that no matter how drastic a method is needed to keep a felt running at full speed, it is more efficient than slowing down or cutting felts off before they are worn out. Your profit is not made while the machine is down for felt changes, nor when you slow down to make a felt work.

There is another point I would like to make. I have known some mills, particularly board mills, where they would weight the second or third press felt for a period and then, because the felt became dirty, would remove the weights and, in some cases, counterweight the top roll, to prevent crushing. If a felt runs three months under these conditions, it is still not a very good investment. I consider a felt as a piece of equipment which must give full value all its life. In other words, a felt must be made for operation at full speed all the time it is on the machine. If it is possible to build long life in the felt too, along with good operating qualities, it should be done, but a most important consideration must always be production.

Now, regardless of the cleaning methods mentioned, many felts still fill up, and must be washed. This is particularly true of fourdrinier felts. Our company and probably other felt companies have a laboratory service whereby they wash out a piece of a dirty felt and then send you recommendations. We do not sell washing compounds. There are any number on the market which when properly used, will help to clean the felt without injury. I should like to caution you about one or two things. Do not allow the washing water to be used any hotter than 120 Fahr, and try to avoid the use of tri-sodium phosphate in any but the mildest concentrations. The high temperature is liable to cause continued fulling, or shrinking of your felt; in some cases it results in stretching.

The best way to clean felts on a board machine, in my experience, is with high pressure showers. I believe that a shower pressure of 50 to 75 pounds, at the felt, is necessary to keep a felt clean.

In some cases where trouble has been encountered with cleaning board machine felts, the mills have added more showers with no more pressure. Possibly the added volume of water helps to clean the felt, but I believe a proper set-up of showers with sufficient pressure would do a better job.

I have seen other mills where, in order to get water for the additional showers, they have had to use white water. I do not believe that any felt should have white water showered on it unless the water is

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practically clean. There is not only the fact that dirt is being thrown back into the felt but also the possibility of shower nozzles being plugged up and so leaving areas of the felt which are not showered for short or long periods of time.

At one time or another in the past I have talked of what I call the correct theory of cleaning board machine felts with showers and a whipper. I think it worthwhile at this time to again go over this theory. I will draw a sketch showing a normal whipper hookup on a board machine bottom felt.

The inside shower should be directed at right angles to the felt, ahead of the point of contact of the whipper. This shower *must* have sufficient pressure so that the water will penetrate through the felt. Seventy-five pounds water pressure, properly applied, will not injure the felt. The dirt has entered from the face of the felt and the only way it can be removed is for the water to serve as a vehicle to carry it back to the face of the felt. To do this the shower must have sufficient pressure to carry the dirt through the felt.

Then the whipper strikes the felt and knocks off some of the dirt, and loosens more of it. Then the following shower should be after the whipper and should strike the felt at approximately a 45-degree angle towards the whipper. This shower is a flushing or shearing shower and should by no means be directed directly towards the felt. If this second shower is followed by squeeze rolls, a suction box or a suction felt roll, the felt should be properly cleaned. The one point that I wish to impress upon you is that if you have a suction box after the whipper, it should have sufficient vacuum to dry the felt so the felt will be in condition to pick up the first paper lamination without crushing. In my opinion the box or roll after the whipper should carry six to eight inches of vacuum. Most machines have considerably less than that.

There are several other points which I would like to cover with you. I do not want you to think I am trying to sell more felts, but I would like to point out the experience of one mill in particular in improving machine efficiency.

This is a board machine making kraft board. Formerly they ran their felts as long as they could changing them only when each was worn out. Their average production on this one machine was 144 tons a day and their felt cost was approximately $1.46 per ton.

Because of the demand for paper they decided to try and change their felts all at once in order to save shut-down time. They put on a new set of felts including a top, bottom and two press felts. When the first of these felts wore out, in this case the top felt, they cut off all four felts and installed four new ones. They continued this practice for some time.

Their over-all felt cost per ton went up to $1.64 but their daily prediction went up to an average of 161 tons per day. The profit on this extra production of course much more than offset the increased felt cost per ton.

There are any number of other mills where I could cite similar experiences. It comes back to the point that when produc-tion is needed, everything is done to increase the speed and operating time of a machine. When demand for paper is less than production, the operators try their best to get the most out of their clothing. In my opinion, this is false economy.

Plant Layout from a Materials Handling Standpoint*

EVERETT LAITALA

Associate Professor
Mechanical Engineering
University of Illinois

Why are we so interested in plant layout and materials handling? We are interested in them to the extent they will affect favorably specific factors as floor space required, material handling costs, inventory, manufacturing cycle, damage to product, safety, and working conditions.

In short, we are interested in them to the extent to which we can turn out a higher quality product, at a lower cost, and give better delivery of goods or services to the customer. Our success is judged by the customer who, by his willingness or unwillingness to buy our product, determines whether or not our plants run.

The term plant layout is used universally to mean the geographical arrangement of equipment, departments, and various facilities. It will be used here to refer to any layout, whether it be a warehouse, office, retail store, stock room, or manufacturing department. There are several factors that affect the layout of an enterprise or any part of it. The major ones are:

1. Materials Handling
2. Design of Product
3. Volume of Units Sold
4. Design of buildings
5. Safety
6. Human factors
7. Balancing of work load of operators
8. Tool design
9. Process planning
10. Methods engineering
11. Working conditions

While some of these factors seem to be related only to manufacturing, they could with only a little revision and adaptation be associated with any type of organization or activity.

To what extent does materials handling affect the location and arrangement of facilities? Before answering this question, it is necessary to indicate what we mean by materials. Actual production work involves co-ordination of materials, men, and equipment, regardless of the nature of the business. When we speak of materials handling, we generally seem to refer to the first item mentioned, namely, material; that is, the material we find in the component parts or the final product itself. However, if we look at these three items, material, men, and equipment, from a very fundamental point of view and reclassify them, we arrive at the conclusion that material is material, man is material, and equipment is material. Therefore, when we are considering materials handling in terms of plant layout, we must consider which one, which two, or should we move all three types of material.

If you think of materials handling as the movement of only the product material, then our new classification of material, namely, material, material, and material opens up six additional alternatives for consideration.

With the above concept of materials, let us turn back to the question we put forth previously, namely, to what extent does ma-

(Turn to page 388)

(*) Abridged from a talk delivered in the Packaging and Materials Handling "Short Course" jointly conducted by the Industrial Packaging Engineers Association and the University of Illinois Extension Division, Hotel Sherman, Chicago, October 4-7, 1948, as part of the Third Annual Industrial Packaging and Materials Handling Exposition.

One of the Men Behind Eastwood Wires...

Jack Cove

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After all the care that goes into fashioning Eastwood wires, Jack Cove won't let anything happen to spoil their perfection. That's why he carefully makes a "cocoon" of soft packing to protect the finished wire. Next, he cradles it in a strong wooden box. All of this loving care is taken to make sure the wire reaches the mill in perfect condition, ready for a long and useful life of papermaking. Eastwood employees know that our wires represent *their* reputation too.

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New EQUIPMENT and SUPPLIES

Improved Fastening System

Self-powered, it sets 63 sizes and types of pins and studs into steel, concrete, masonry and other hard materials.

Stemco Corp., Rocky River 16, O., is now marketing the Ramset fastening system which operates by means of a powder charge. Pins and studs up to 6 in long and ⅜ in diameter can be set instantly into metal and hard surfaces and one good, careful workman can set 50 or more fasteners per hour.

Since the tool is built with multi-safety features, claimed to be positive in their operation to guard against accidents, it is considered easy and safe for competent operators. It can be used in industrial maintenance or new construction work of practically any kind of fastening into or with materials such as electrical or other installations, roofing, siding, heating, piping, air

conditioning, etc. Saves time, money, results in clean tight fastenings and speeds completion of the work.

Two sizes are available, the light-duty model (12 inches long, wt 5 lb) and the heavy-duty model (18 inches long, wt 10 lb), the difference being in the size-capacity and penetrating power, with three strengths of powder charges for each tool. A compact, metal carrying kit permits transfer from one job to another or for storage when not in use.

Tensile Tester

A versatile precision instrument based on electronic principles.

Instron Engineering Corp., 2 Hancock St., Quincy 71, Mass. has developed a unit that makes possible accurate load - elongation measurements of plastic and textile materials, wire, paper, rubber, adhesives and similar specimens. Full scale load range extends from 2 grams up to 5000 lb and jaw speeds from 0.02 to 20 inches per min. Flexibility of controls permits a variety of unique testing techniques for the determination of special properties as well as for routine measurements. Unusual drive operating the pulling jaw provides controlled rate of elongation of the sample, over a wide range of speeds, in either direction of travel and with instant reversibility.

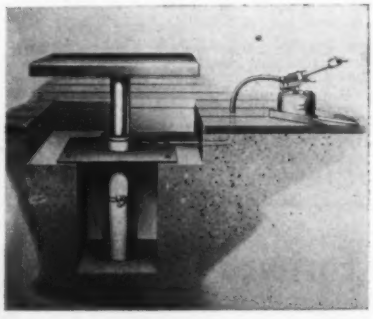
The chart of the high speed recorder is driven at various speed ratios with respect to this jaw so that tensile load-elongation curves of the material are made accurately at constant rate elongation. Push-buttons control operation of the pulling head and can be made automatic by adjustable, close-

tolerance switches which control the gage length, cycling points and other functions. Chart speeds are from 0.2 to 50 inches per min and in combination with available head speeds provide magnification ratios up to 1000 to 1.

Elevating Platform

A "package" unit that is easily installed.

Lyon-Raymond Corp., 1702 Madison St., Greene, N. Y. is marketing a flush-with-floor type hydraulic elevating platform. Available models have from 30-in to 36-in square tops with elevation from floor level up to 36 inches. It is claimed that 2000-lb



loads can be easily raised by means of the single speed hydraulic foot pump which is provided. Platform can also be elevated by means of a power operated pump featuring either the push button or foot switches.

Cord Conveyor Belts

Have 2 to 6 times the impact resistance of fabric belts.

Rubber covered conveyor belting is now being manufactured by B. F. Goodrich Co., Akron, O., which company claims its line has many advantages over the conventional fabric belts. Since the cord plies are not stiff, the belt is more flexible, both lengthwise and crosswise, and makes better contact with pulleys and with horizontal idlers thus runs straighter when empty or loaded intermittently and resists "creasing" action between horizontal and troughing idlers. These belts have plenty of elasticity but less permanent stretch, tremendous adhesion between belt cover and carcass, and greater resistance to moisture and mildew damage. Two grades are available, a Longlife and Super Longlife, and both can be made with cords of varying strength.

Versatile Magnet

Strength is adjustable, depending upon its purpose.

General Scientific Equipment Co., 2700 W. Huntington St., Philadelphia 32, Pa., has introduced to the market a new fountain pen size G-S Magnetic Probe, made of super-magnetic alloy, and provided with a pocket cli pfor safe, easy carrying. Extension of magnet from streamlined polished bakelite case governs the strength desired and is controlled by turning end-knob.

The instrument is particularly useful for removing steel, nickel or iron particles from operating areas of electrical equipment or delicate mechanisms, storage bins, holes and

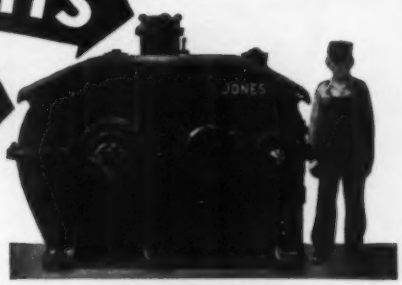
hard-to-reach places. Assemblers and inspectors find it useful to test coat of surfaces for magnetic properties of the under-material and first aid station attendants find it useful in removing steel splinters from the eyes or skin of employees. It is claimed that sterilization of the probe does not harm the magnet.

Liquid Phenolic Resin

Excellent retention permits its use in either open or closed systems.

The first successful commercial production of laminating and molding sheet stock and molded pulp products using liquid phenolic resin for direct addition to pulp in paper-mill beaters has been announced by Snyder Chemical Corp., Bethel, Conn., and is known as Synco 721. This material is a phenol-formaldehyde condensation polymer of high molecular weight which has been developed especially for beater addition to fibrous pulps and is employed successfully with all of the various types of fibers including wood pulps, miscellaneous vegetable fibers, animal fibers, mineral fibers, synthetic fibers and mixtures of any of the foregoing.

Whether you need THIS —or THIS



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Synco 721 is not an emulsion and does not contain alcohol or other inflammable solvents, and may be used with all types of paper machinery as the stock does not become tacky in the least and does not clog fine screens or felts. Exceptionally high wet strength papers for packaging, filters and wet-abrasive backings are obtainable with 721; in some instances, the strength in the wet condition exceeds that of the dry sheet. This material is also compatible with acrylonitrile-butadiene co-polymers, such as Hycar Latices, and moldings and laminates made in this manner exhibit extremely high impact and flexural strength.

These molding and laminating compounds also have greatly improved flow, and improved resistance to such agents as hot oil, abrasion and tensile stresses. Modified compounds are fast curing and surface finish is unimpaired. In a general way, the flow properties of these molding compounds are about normal with respect to the resin content, and exception to this rule is that the Hycar modified compounds have much greater flow. Pressures will range from a few hundred to a few thousand pounds psi, depending upon various factors. Average temperatures are within 280-310 Fahr. It is claimed that cure times are quite rapid in comparison with other phenolics, depending, of course, on the thickness of cross section.

Smoke Detector

For early detection of incipient fires in hazardous plant and warehouse areas.

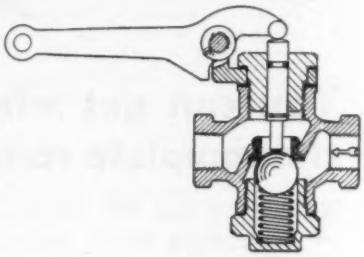
A single unit photoelectric smoke detector has been developed by engineers of Walter Kidde & Co., Inc., 40 E. 34th St., New York 16, N. Y. The design and operation of this new instrument is similar to those of marine type detectors which Kidde has been building since 1917. A control panel is the nerve center of the smoke detector and it not only transmits fire alarms but also gives warning of mechanical and electrical disturbances within the apparatus. It is claimed that this equipment often betrays the presence of smoke before thermostatic or heat actuator alarms or devices are affected. The detector is a useful adjunct to built-in carbon dioxide fire extinguishing systems, either manually or automatically operated, when its circuit is tied in with controls to operate ventilating dampers, door-closing releases or electrical equipment power cut-off.

Operating Valve

Quick-opening lever adjusts it to any horizontal position.

A new self-sealing air or water operating, ball type valve, known as Type BA-1, has been announced by Leslie Co., 159 Delafield Ave., Lyndhurst, N. J., and is ideally adapted for air whistles, control of pneumatic cylinders on lifts, hoists, presses, etc., cleaning air blasts on forging hammers, as a small valve for general service in machine, repair, railroad shops, etc., as a small valve for control of flushing liquids and as a quick operating shower valve for emergency showers in chemical plants, etc.

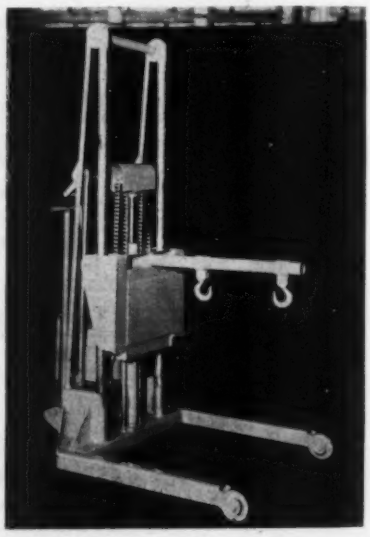
It is suitable for use with air, water and other non-corrosive fluids up to 200 psi pressure and temperatures up to 150 Fahr. air and 180 Fahr. water. Inlet pressure causes the ball valve to close tight and prevents collection of dirt or other foreign matter. A stuffing box is eliminated by sealing the stem with an O-ring not accessible to tampering or adjustment. The valve is constructed with cast semi-steel body, integral rubber seat insert, screwed connections, ½ inch size, and can be bushed to ¼ inch or ⅜ inch.



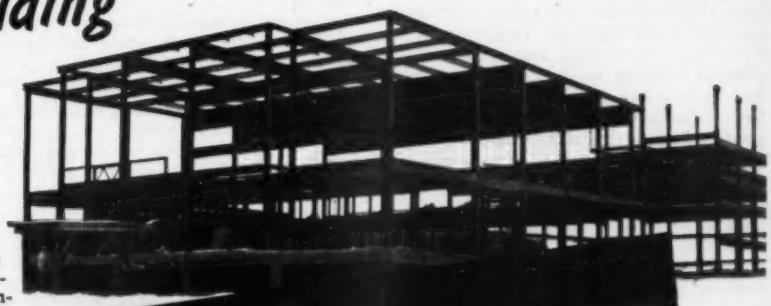
Special Truck

Helps to eliminate damage to delicate but heavy electrical instrument assemblies and increases speed of packing operation.

A portable unit has been designed by Lyon-Raymond, 1702 Madison St., Greene, N. Y., which features a hydraulic elevating boom with elevation from 16 inches in the lowered position to 70 inches when fully elevated. For the packing operation, a special sling arrangement fastened to two hooks suspended from the boom holds the assembly and it is lifted by means of a hand pump actuating a hydraulic hoist. The shipping crate is placed between the base forks of the truck and the load is gently lowered by a finger tip control. A special control valve is provided to increase the accuracy of control while the load is being lowered.



School's First Problem— Solved by Welding



Designers of the new Archbishop Stepinac High School, White Plains, N. Y., specified 12 continuous girder supports for the auditorium and gym roof, ten of them over 80 feet long. In fabricating the steel for the school, Ingalls chose to weld the girders, primarily to save weight. Several other important benefits resulted, besides the saving of 22 tons of steel: The simpler design allowed extreme economy in fabrication. Time was saved, as a smaller variety of parts was required in welding. And the finished girders, which were left exposed, presented an exceptionally smooth appearance.

If you have a construction problem, call on Ingalls, pioneer in modern welding and fabrication methods.

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Matthew F. Hiller, Engineer

Geo. A. Fuller Co., Builders

Gilbert D. Fish, Consulting Engineer

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The turbine division of General Electric, Schenectady 5, N. Y., has announced its new Type DR mechanical-drive turbine, for high and wide speed ranges and greater accuracy of control. A position restored oil-relay governor provides adjustable speed ranges up to 5 to 1, and is sufficient to handle all types of variable speed pumps, fans, compressors, blowers, stokers and some types of paper machines. A steady state accuracy within ¼ of 1 per cent is achieved. Ratings up to 1500 hp are available with speeds from 1000 to 8000 rpm. Many parts are interchangeable on all frame sizes of both DP and DR units. Common shaft height and coupling fit simplify installation and relocation.

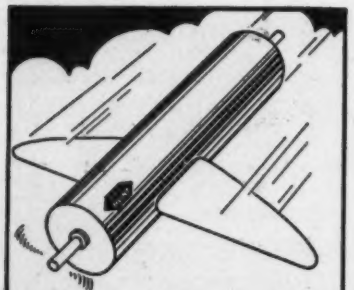
▼

Plant Layout . . .

(Continued from page 383)

terials handling affect plant layout? No specific answer can be given without knowing the specific conditions of the problem. This much, however, can be said, that in general the handling of material has a tremendous bearing on the ultimate arrangement of facilities. If we analyze any activity to classify it in terms of fundamental parts, we will conclude that all activity can be classified into mental and physical effort; physical effort is materials handling.

Are there any common characteristics of layout and materials handling in all enterprises?



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Basically, it seems that all businesses have three areas of activity, namely: 1. Incoming materials (receiving and storage); 2. Intermediate; 3. Outgoing materials (storage and shipping).

If we are in manufacturing, we can visualize our materials handling and layout problem in terms of receiving and storage of incoming materials. Then we have an intermediate activity consisting of a transfer of the materials from storage to a manufacturing department where they are processed. Then we have the third phase of activity in which the finished goods are stored and shipped.

If our interest is from the viewpoint of a wholesale distributor or mail order house, our basic pattern is the same as for the manufacturing plant; the difference lies in the nature of the intermediate activity. In some cases this intermediate activity may be almost zero since the item can be sent out in the same unit-load condition as when received. In other cases, to assemble a customer's order may require unpacking, packing, wrapping, and crating. The specific nature of the work determines what the layout shall be and what materials handling equipment would prove most economical.

If our interest is from the viewpoint of a retail store, the basic pattern of incoming materials, intermediate activity (selling) and outgoing materials is also the same.

While we find that all concerns have certain common characteristics of materials handling, we also find that because of a wide range of products and materials handled, such as the bulk, weight, shape, condition, volume of units sold, and because of the design of buildings used, that very great specific differences occur.

Out of this environment of tremendous differences arises a universally accepted observation. It simply states that *it is not possible to solve a problem unless we know the exact conditions of the problem.* Use of this principle cautions us against being taken off our feet by the success story of some other plant in solving its layout and materials handling problem. We cannot bypass a real study of our own problem by taking someone else's solution to their problem. There are very few instances of a simple solution to a complex problem.

In solving plant layout and materials handling problems, it is well to do *more pencil and paper work and less lip work.* It is not possible to by-pass getting facts and analyzing them. Professor Pigage, in his talk "How to make a survey," gave very helpful suggestions on how we might go about collecting information in such a way that we might not overlook key items of information. I was once associated with a study of a fork truck for removing steel from box cars to a storage area. We made a fine analysis in all respects but one. When we received the truck, we found we couldn't get it into the plant because of the height of the doorways. This was not such a serious mistake, but nevertheless it was temporarily embarrassing and was one we should have anticipated. There are, however, on record many very serious and costly errors because of inadequate analyses.

What suggestions can we make for studying our plant layout from the standpoint of materials handling?

1. Determine first what the problem really is. This is more difficult than figuring out the answer to it. It means that we shouldn't worry about a solution until we know what we are trying to solve. If the errors made in plant layout and in the selection of materials handling equipment are analyzed, it will be found that the decisions made were correct based upon the facts assembled, but that the facts were incomplete resulting in error.

2. Remember that every problem calls for special treatment. No two problems are identical. This suggests, "Don't try to save time by using someone's solution to their problem." Consider them only as aids in analyzing your own.

3. Remember too that a good solution for today's problem may be out of date tomorrow. Constantly review the facts in terms of changes in volume of product sold, design of product, service rendered, new equipment, and techniques recently developed.

4. Get information on paper and assemble and arrange data for ease in making decisions. Our minds are wonderful instruments but very poor places to keep records. They tend to be cluttered up with runs, hits, errors, who is Mrs. Hush, golf scores for the 18 holes around the course, football schedules, corn prices, bridge rules, meetings, etc. There should be no need to remember facts that can be found quickly from records. The real function for our brains is decision making, not record keeping.

5. Use graphics wherever possible. We can analyze a set of data much more quickly and soundly when in chart form rather than in a table giving a mass of figures.

6. We should have layout drawings of our plants, warehouses, and offices. Most activities today are so complex that the human mind can grasp and handle only a small part of them at any one time. Study of the layout of facilities is no exception. If we record all the details on the layout drawing, then the whole problem can be visualized more conveniently in terms of its components.

7. Use templates and scale models to assist in analyzing a problem. It is much easier and cheaper to move a template or a scale model from one end of the plant to another or from one floor to another than it is the real machine. It is without question much more reasonable to discover by use of a template or scale model that the aisles of the plant are not wide enough to accommodate the real thing or that if we purchase the new equipment we will have to saw off some columns if it is to fit where we want to use it.

8. Remember, too, that a building has volume, not only floor area. A building costs so much per cubic foot as well as so much per square foot and that materials must be moved up and down as well as sideways. Consider, therefore, the use of three-dimensional scale models for equipment, buildings, and people. It is very difficult to visualize a three-dimensional problem in two dimensions.

9. And lastly, let's remember that the physical analysis of our plant layout and materials handling problem must be coupled to the economic analysis to which the customer subjects our work. All he wants is a high quality product, at a minimum cost and on time.

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New Catalogues and Publications

Winders. Appleton Machine Co., Appleton, Wis.—4-page booklet describes and illustrates the L Model Winders produced by this company. Various operating features and dimensional table of several models are included. Pictures illustrate the new riding roll, aluminum holder for score-cut slitting and spherical type separators.

Lubrication. Farval Corp., 3293 E. 80th St., Cleveland 4, Ohio—8 page Bulletin No. 25 entitled "Studies in Centralized Lubrication" gives reports by users of the centralized lubrication system in several industries. Advantages are incorporated in these reports.

Pulleys. Rockwood Manufacturing Co., Inc., 1801-2001 English Ave., Indianapolis, Ind.—6-page folder contains reduced price list for stock pulleys produced by this company, also list prices of offset keys.

Knife Grinders. Samuel C. Rogers & Co., 183-205 Dutton Ave., Buffalo, N. Y.—8-page price list No. 32 includes this company's complete line of knife and face grinders, saw sharpeners and accessories with index, capacities, illustrations and prices of each model size.

Electric Brakes. Westinghouse Electric Corp., 306 4th Ave., Pittsburgh 30, Pa.—24-page pocket size booklet entitled "Westinghouse Hints on Electrical Maintenance," Section 24, explains maintenance for different types of electric brakes. The booklet includes tables on retarding torque, schematic diagrams and illustrations.

Rotameters. Schutte and Koerting Co., 12th and Thompson Sts., Philadelphia 22, Pa.—12-page Bulletin 18-RC describes and illustrates this company's line of electronic, electric and pneumatic recording and controlling rotameters. The numerous photographs, cutaway views, sectional drawings and functional diagrams explain construction, operation and application of the rotameters.

Organic Chemical. Koppers Co., Inc., Chemical Div., Pittsburgh 19, Pa.—28-page technical bulletin No. C-9-111 describes the physical and chemical properties and lists important industrial uses of the fluorescent compound, betamethyl umbelliferone. Data and graphs show the ultraviolet and infrared absorption spectra as well as the fluorescence spectra of the compound. Included are 46 references to pertinent technical and patent literature.

Motor Regulator. Reliance Electric & Engineering Co., 1076 Ivanhoe Rd., Cleveland 10, Ohio—2-page Bulletin K-2325 describes and illustrates the improved Section Interlock Regulator produced by this company. Principles of operation, integral motor mounting, and related features of the regulator are reviewed and four typical installations pictured. Exposed view of regulator's differential gears and its application on a co-ordinated drive are also shown.

Booster Compressors. Worthington Pump and Machinery Corp., Harrison, N. J.—8-page Bulletin C-1100-B34 is an illustrated booklet which describes application, design features and specifications of ammonia booster compressors produced by this company. Sectional pictures of a compressor and its various parts, illustrations of different models and their specifications and schematic drawings are included.

Conveyor Belts—B. F. Goodrich Co., Akron, Ohio—4-page folder describes and illustrates applications of the "Griptop" conveyor belt with the non-skid cover produced by this company. The belt is designed for conveying materials at angles of incline too high for conventional belts.

Straddle Trucks. Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.—Two 16-page bulletins describe and illustrate the trucks produced by this company. Form 1073 describes the MH Straddle Truck, shows pictures of its uses, and contains specifications, dimensional table and diagramatic sketch. Form 1118 describes the new "M" Straddle Truck.

Hose. B. F. Goodrich Co., Akron, Ohio—Three 4-page bulletins describe various types of hose produced by this company. No. 3440 describes acid hose for discharge, suction and pinch-valve service. It includes illustrations, a table listing recommended concentrations, temperatures and pressures of the various acids, outline of advantages for different services and specification tables. No. 4030 describes and illustrates the line of hydraulic control hose. Recommended uses for this type of hose are listed and specification tables and a method of calculating correct bending radii for various hose sizes are included. No. 4800 describes and pictures construction of each type water hose the company manufactures, lists recommended uses and gives detailed specifications and coupling information.

Statistics. New York University College of Engineering, Washington Square, New York 3, N. Y.—4-page folder titled "Application of Statistics to the Science of Management" covers various phases of this subject and gives basic data on industrial management.

Hydraulic Shop Presses. Rodgers Hydraulic, Inc., St. Louis Park, Minneapolis 16, Minn.—18-page catalogue No. 313 describes and illustrates the complete line of hydraulic shop presses produced by this company. It includes construction and operation features, specifications, descriptions of hand and power pumps and press accessories, and diagramatic sketches of applications.

Cleaner. Oakite Products, Inc., 22 Thames St., New York 6, N. Y.—36-page booklet describes and illustrates Oakite service through its field representatives. Graphic description of a training course for field service specialists is included.

Alloys. Cooper Alloy Foundry Co., Bloy St. & Ramsey Ave., Hillside, N. J.—Volume 1, Number 1 of a new 4-page periodical entitled "Newscast," provides information about the uses and properties of stainless steel castings. Application stories on how this company's castings serve in industry and detailed technical data about these alloys will be used in conjunction with special features such as Items of Interest; Questions and Answers selected at random from Sales Engineering Files; and Technical Topics, a column devoted to detailed examination of a specific metallurgical design or casting problem.

Radioactive Materials. Arthur D. Little, Inc., Cambridge 42, Mass.—13-page booklet entitled "Industrial Uses of Radioactive Materials" contains bibliographical information on the industrial uses of radioactive tracers, and includes general background references, survey articles of industrial applications, references dealing with specific fields, such as petroleum, textiles, instruments, etc.

Protective Coatings. Dennis Chemical Co., 2701 Papin St., St. Louis 3, Mo.—4-page folder entitled "Perma-Skin Vinyl Corrosion Resistant Protective Coatings" discusses combatting corrosion of metal, wood, stone, brick and concrete structures and equipment by atmospheric and chemical action.

Turbine Agitator. Mixing Equipment Co., Inc., 1024 Garson Ave., Rochester 9, N. Y.—Bulletin on a new Heavy Duty "Mixco" Turbine Agitator gives complete details on the new mixer drive which completely isolates shaft flexures from the gears. Details on various impeller types as well as specifications of the complete unit are included.

Coating Equipment. Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland 11, Ohio—18-page booklet entitled "The Handling of Webs and Monofilaments" is a liberally illustrated study of coating operations involving flexible and continuous strand or web materials such as wire, monofilaments, cords, tapes, tubings, paper, textiles and films. It shows the similarity of handling problems encountered in extrusion takeup of wire or cable as compared with the coating of textiles with plastic for electrical insulation or for decorative coating of fabrics or papers. Included are diagramatic sketches of the various types of equipment used in these operations.

Management Problems. J. Walter Thompson Co., 420 Lexington Ave., New York 17, N. Y.—20-page booklet entitled "Distribution" is a discussion on questions concerning distribution costs and its role in our economy.

Code Call Unit. Signal Engineering & Mfg. Co., 154 W. 14th St., New York 11, N. Y.—6-page folder, Bulletin 4B-263, describes advantages, operating features and illustrates typical applications showing wiring diagrams of the new Code Call Unit produced by this company.

Roof Problems. Tremco Manufacturing Co., 8701 Kinsman Rd., Cleveland, Ohio—32-page brochure entitled "Solving Roof Problems" discusses the causes of, as well as remedies for, roof problems. The subject is divided into 15 sections and describes the manufacture of various kinds of roofs, factors involved in the deterioration of roofs and how roof troubles can be diagnosed.

BOOK REVIEWS

Sulfitezellstoff-Ablaugen (sulfite waste liquors)—By Hans Vogel. The book is divided into two main parts: I, which deals with the properties and investigation of the waste liquor, and II, which takes up the concentration and utilization of the liquor and which includes a fairly comprehensive section on patents. Part I is subdivided further into the history of sulphite pulping, the composition of wood, and of the waste liquors and the qualitative and quantitative analyses of these liquors. Part II goes largely into the details of technical utilization, placing special emphasis on the recovery of calcium sulphite and sulphur dioxide, and giving in outline the possible production of oxalic acid, furfural, cymene and protocatechuic acid, vanillin, and various binders. The fermentations of sulphite waste liquor, however, are fully stressed, and most of its important commercial possibilities (such as its uses in tanning, briquetting, textiles, fertilizers *et all*) are mentioned. Although American references are rather scant, the European literature has been well reviewed. Printing and cloth binding are excellent. There are 302 pages with 12 illustrations and 52 tables. The book, which is in German and priced at 35 Swiss francs, may be obtained through B. Wepf and Company Verlag (publishers), Basel, Switzerland.

Photography In Engineering—This book, the first American edition, by C. S. Tupholme is a comprehensive summary of the various uses of photography in engineering and industry. The work is divided into eight basic sections, each with its own bibliography and each profusely illustrated with line drawings and photographs. The various divisions of the book deal with such subjects as the photography of drawings and documents, photography in the laboratory, radiography, high-speed photography, X-ray and electron diffraction and microradiography, processing and storing X-ray material, infrared photography, and instructional motion pictures. No attempt has been made to cover all of the specific applications of photography in each of the branches covered; only on those which are typical of many other applications in the same field have been treated. The book has 276 pages, some 188 plates, and 73 figures.

There are many references in the text which, combined with the bibliographies given at the end of each chapter, will give the reader a quick research service.

The price is $6.50, and the book may be obtained from the Chemical Publishing Company, 26 Court Street, Brooklyn 2, New York.

The Paper Year Book (1949 edition)—The seventh annual edition of this encyclopedia of paper has been completely revised and brought up to date. The publisher states that for the first time a complete division of more than 100 pages is devoted exclusively to printing and fine papers.

This volume of 592 pages presents complete and detailed information on more than 1,000 different papers and paper products, as well as related items—it is illustrated with more than 7,000 photographs and 100 charts and tables. Among the nine major divisions of the book are sections on coarse paper and paper product data, fine paper and printing paper data, charts and tables on printing and wrapping papers, paper markets, practical paper testing and papermaking.

The book is bound in a hard cover of yellow leatherette embossed in black. It sells for $10.00, and may be purchased direct from the publisher, the Davidson Publishing Co., 22 E. Huron St., Chicago, Ill.

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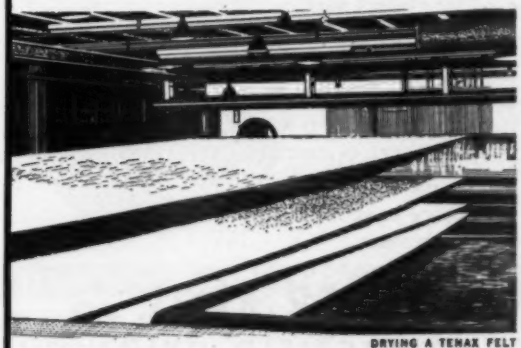

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- ☐ HARDWOOD SULPHITE.
- ☐ BLEACHED AND UNBLEACHED SULPHITE.
- ☐ SODA PULP.
- ☐ KRAFT KNOTTER REJECTS.
- ☐ KRAFT SCREEN REJECTS.
- ☐ SULPHITE SCREEN REJECTS.
- ☐ WASTE PRINTED PAPERS, WASTE LEDGERS.
- ☐ WASTE WET STRENGTH PAPERS.
- ☐ WASTE CORRUGATED PAPERS.
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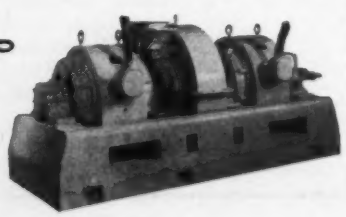

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Blue Overalls	6.75 to 7.00
Corduroy, Men's	5.75 to 6.00
Corduroy, Ladies'	5.75 to 6.00
Washables, No. 1	4.25 to 4.50
Percales	6.50 to 6.75
Light Prints, No. 1	6.25 to 6.50
Khaki Cuttings—	
Bleachable	6.00 to 6.25
Unbleachable	5.25 to 5.50
New White Canvas	11.50 to 12.00
New Mixed Blacks	5.25 to 5.50
Canton Flannels, Bleached	10.75 to 11.00
Shirt Cuttings—	
New White No. 1	10.50 to 11.00
White Shrunk	10.00 to 10.25
Silesias No. 1	8.50 to 8.75
New Unbleached	10.50 to 11.00
Fancy	6.00 to 6.25
Linen Cuttings—	
American	8.00 to 8.50
White	14.00 to 15.00
Grey	13.50 to 14.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.15 to 1.20
No. 2	1.05 to 1.10
No. 3 and No. 4	.85 to .95
Twos and Blues—	
Repacked	3.00 to 3.25
Thirds and Blues—	
Repacked	2.85 to 3.00
Miscellaneous	2.25 to 2.50
Whites, No. 1—	
Repacked	4.75 to 5.00
Miscellaneous	3.75 to 4.00
White, No. 2—	
Repacked	3.50 to 3.75
Miscellaneous	2.75 to 3.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
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Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

Gunny No. 1—	per cwt.
Foreign	Nominal
Domestic	8.00 to 8.50
Wool Tares—	
Light	8.00 to 8.50
Heavy	8.50 to 9.00
No. 1 Scrap Bagging	6.00 to 6.50
Manila Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.00 to 5.25
Sisal Rope—	
No. 1 large	5.00 to 5.75
No. 1 small	5.00 to 5.25
New Burlap Cuttings	8.00 to 8.50
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	5.00 to 5.25
No. 2 sisal	4.50 to 4.75
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts.	95.00 to 100.00
Hard White, No. 1	75.00 to 80.00
Soft White No. 1	70.00 to 75.00
Soft White, one-cut	85.00 to 90.00
Soft White, Misc.	55.00 to 60.00
Fly Leaf, No. 1	30.00 to 35.00
Fly Leaf, Woody, No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines	18.00 to 19.00
Mixed Books	13.00 to 14.00
Ledger Stock—	
No. 1 White	40.00 to 45.00
No. 1 Mixed (Colored)	30.00 to 35.00
Manilas—	
New Env. Cuttings	60.00 to 65.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	70.00 to 75.00
Colored Manila Tab Cards	40.00 to 45.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	30.00 to 35.00
New 100% Cor. Cuts	30.00 to 35.00
No. 1 Old Assorted	25.00 to 27.50
News—	
White Blank	60.00 to 65.00
Overissue	14.00 to 15.00
No. 1 Baled	8.00 to 9.00
Old Corrugated Containers	9.00 to 10.00
New Jute Corrugated Cuts	18.00 to 19.00
Mill Wrappers	6.00 to 7.00
Box Board Chips	5.00 to 6.00
No. 1 Mixed Paper	5.00 to 6.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	77.50—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.25 to 4.50
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	20.00 to 20.50
Argentine, lb.	18.50 to 19.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.40 to 2.70
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.24½ to .25
Litharge, powd., bbl. lb.	.15 to .15½
Rosin, (Gum)—	
New York, per 100 lbs.	
E	7.30—
F	7.30—
G	7.30—
WWX	7.40—
Rosin (Wood), carlots	5.70—

MARKET QUOTATIONS

Salt Cake—	
Dom. bulk (wks) ton	26.00 to 28.00
Imp. bulks on dock—(Atl. ports) ton (Nom.)	27.00 to —
Soda Ash—	
Bulk (works), cwt.	1.10 to 1.20
Paper Bags, cwt.	1.30 to 1.40
Barrels, cwt.	1.70 to 1.80
Soda (Caustic)—	
Solid drums, cwt.	3.05 to 3.10
Ground and flake, drums, cwt.	3.45 to 3.50
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg. 55 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	4.82—
Pearl, barrels, cwt.	4.82—
Paper, (Sp.) bags, cwt.	4.82—
Powdered, barrels, cwt.	4.93—
Sulphur (Crude)	
(Mine) bulk, long ton	16.00 to 18.00
Talc—	
Dom. 100 lb. bags (mine) ton	22.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig, bbls., lb.	.19½ to—
Calcium Pig, bbls., lb.	.19½ to—
Zinc Sulphide, bbls., lb.	11.50 to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

Bleached sulphite, Swedish	130.00—
Bleached sulphite, Finnish	132.50—
Bleached sulphite, dom.	126.00 to 130.00
Easy bleaching sulphite	—
Unbleached kraft, Finn	112.50—
Unbleached sulphite, Swed.	118.00 to 124.00
Unbleached sulphite, Fin.	122.50 to 126.50
Unbleached sulphite, dom.	115.00 to 123.00
Unbleached kraft, Swedish	105.00 to 117.00
Unbleached kraft, northern	105.00 to 112.50
Unbleached kraft, southern	85.00 to 95.00
Bleached sulphate, Swedish	130.00 to 140.00
Bleached soda, domestic	120.00 to 125.00
Sulphite screenings, dom.	40.00 to 50.00
Sulphate screenings, dom.	40.00 to 50.00
Groundwood, domestic and Canadian	60.00 to 65.00

PAPER

f.o.b. New York City

Boards—	per ton
Binders	94.00—
Chip	75.00—
Chip, tube and can	80.00—
Chip, full blending	82.50—
Chip, sgl. mla. lined	80.00—
Coated, white patent .016	115.00—
.020 and heavier	105.00—
Kraft liner	95.00 to 105.00
Filled News	77.50—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	14.40—
B Grade E.F.	14.40—
A Grade S. C.	15.90—
B Grade S. C.	14.80—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	20.15—
No. 2 Glossy	18.90—
No. 3 Glossy	18.15—
No. 4 Glossy	—
No. 2 Offset	14.60—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with some quantity, packing and other differentials allowed:

Rag Content Bond— (In Ton Lots)	per cwt.
Extra 100% Rag	49.30—
100% Rag	42.70—
75% Rag	33.10—
50% Rag	28.10—
25% Rag	24.85—

Rag Content Ledger— (In Ton Lots)	per cwt.
Extra 100% Rag	50.50—
100% Rag	43.90—
75% Rag	35.15—
50% Rag	29.40—
25% Rag	26.15—
Sulphite Bond—	
Air dry, watermarked	—
No. 1 watermarked	17.50—
No. 2 watermarked	16.75—
No. 4 watermarked	15.80—
Sulphite Ledger—	
	per cwt. Zone
No. 1 watermarked	18.80—
No. 2 watermarked	18.25—
No. 4 watermarked	17.75—
Glassine (f.o.b. mill)—	
	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
News—	
	per ton
Rolls, Standard Contract)	100.00 to 103.00
Rolls (Spot)	(Nominal)
Sheets	119.00—
Tissues (Carlots)—	
	per ream
White No. 1	1.60—
White No. 2	1.25—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.45—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs.	8.75 to 10.00
Toilet, Unbleached (M. shts.) per cs.	7.50 to 10.00
Towels—	
	per case
Bleached	4.75—
Unbleached	4.00—
Wrappings (Kraft)—	
	per cwt.
Super-Standard	8.50—
No. 1 Wrapping	7.00 to 7.50
Standard Wrapping	6.75 to 7.00
Standard Bag	6.00 to 6.50
Variety Bag	—
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)	
Bleached Papers—	
	per cwt.
M.F. & M.G. Waxing, 20 lb. (Carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers—	
Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream marked, in bdls.)	—
Wrapp Mla. 35 lb. up—	
No. 1	—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade B20 lb.	—
Grade A-22 lb.	—

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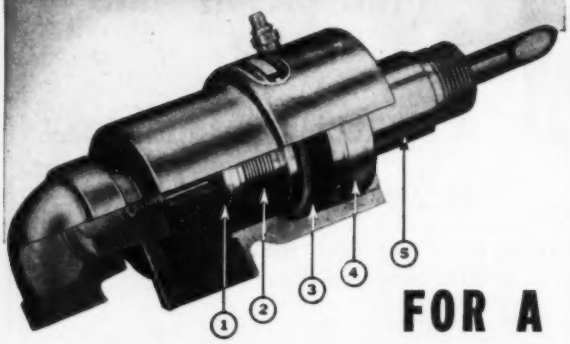

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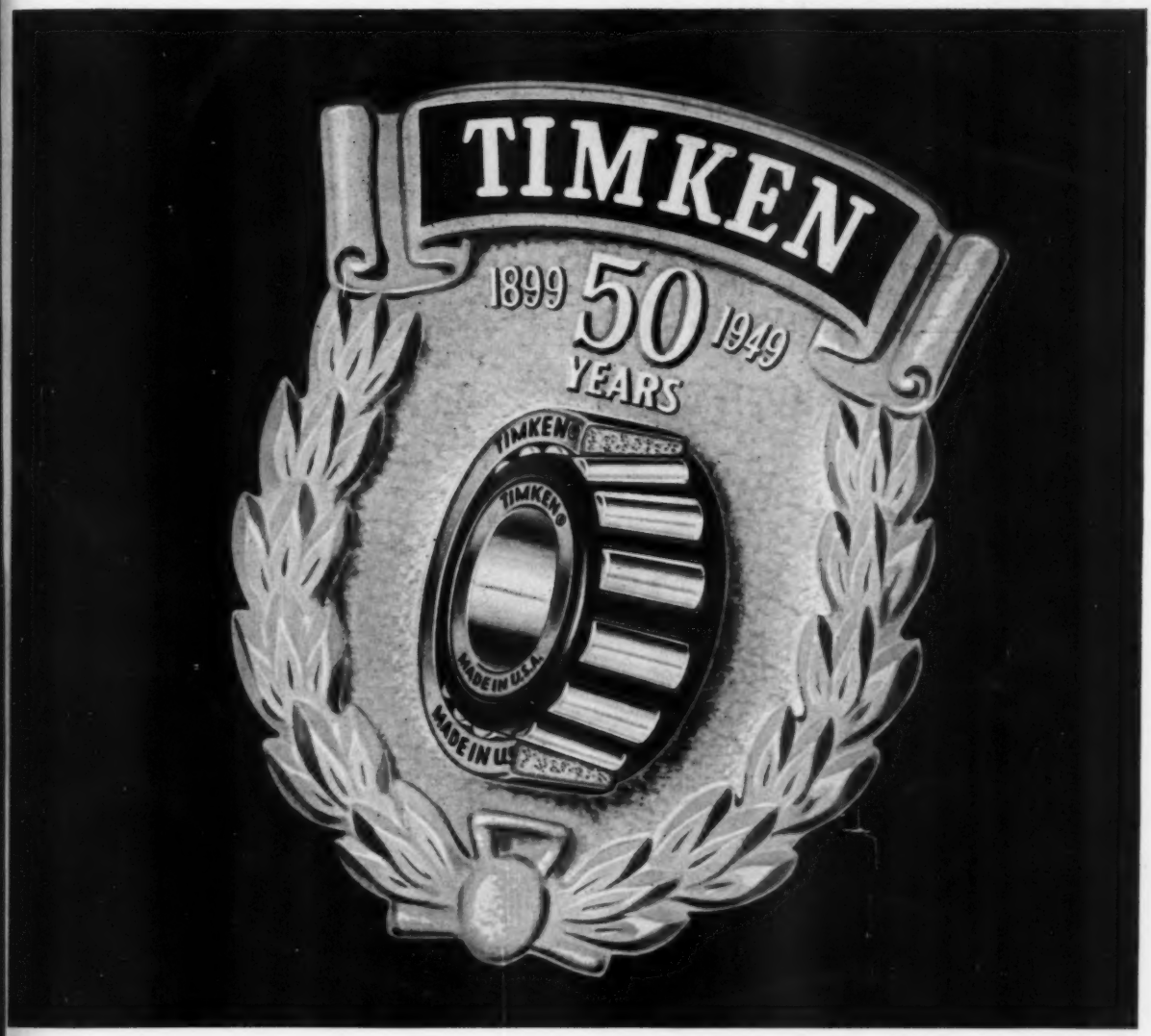
40 Rector Street, New York 6, N. Y.

Soda Ash • Caustic Soda • Caustic Potash • Chlorine • Potassium Carbonate Calcium Chloride • Nytron • Sodium Bicarbonate • Specialty Cleansers • Ammonium Bicarbonate • Sodium Nitrite • Para-dichlorobenzene • Ortho-dichlorobenzene Monochlorobenzene • Methanol • Ammonium Chloride • Formaldehyde



50th birthday of the company whose products you know by the trade-mark: TIMKEN

SINCE 1899 THE TIMKEN ROLLER BEARING COMPANY HAS BEEN HELPING AMERICAN INDUSTRY GET THE MOST FOR ITS MONEY

NOBODY likes to buy a "pig in a poke". In America you don't have to. You're protected by trade-marks like "TIMKEN".

Registered as a trade-mark in the United States Patent Office, "TIMKEN" identifies products made by The Timken Roller Bearing Company: Timken tapered roller bearings, Timken alloy steels and seamless tubing and Timken removable rock bits.

Experience over the years has shown Timken products to be the finest in their respective fields. And many thousands of men and women are working hard to keep them that way. No wonder it has become a habit throughout industry to look for the trade-mark "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

NOW!

DRYERS* ALIKE

AS PEAS IN A POD

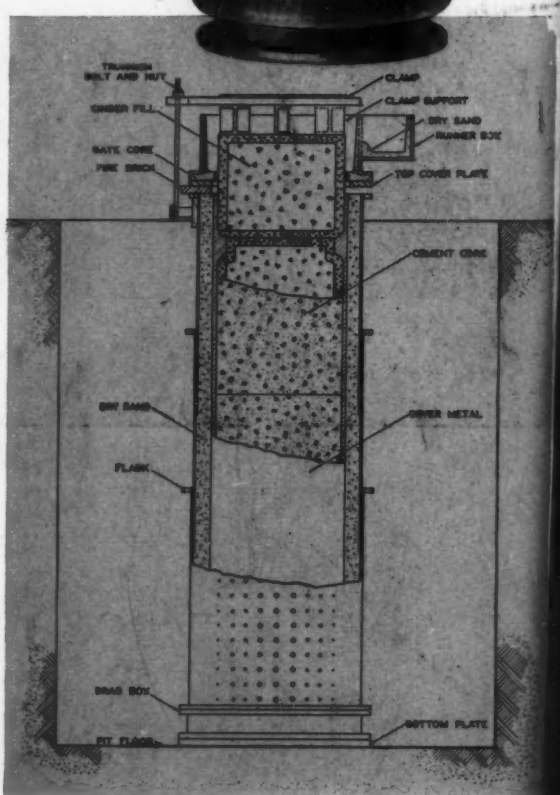
*
NO WEIGHTS
NECESSARY
FOR
BALANCING

From time immemorial, it has been standard practice to use weights for balancing dryer shell castings because of the varying thickness of the shell. This was a poor expedient, a production bottleneck and made dryer uniformity well nigh impossible.

Now, a revolutionary new method (see diagram) developed by Downingtown, using a Cement Bonded Sand Core (photo upper right), enables us to PRECISION CAST duplicate dryer shells in any quantity, each having smooth inner walls and a uniform shell thickness for even drying of the sheet. Boring is not required, thus all the corrosion resistant qualities inherent in the "skin" of the cast metal are retained.

Hundreds of Downingtown "Precision Cast" Dryers are now in use, each having been made and tested under the watchful eye of an authorized inspector. They are made of Downingtown special high-nickel alloy, "Downite 150," which is an exceptionally high tensile strength iron, machines easily to a high finish, and has uniform close-grained density with inherent pressure tightness. They are available in all standard diameters for operating pressures up to 150 P.S.I. and are designed to meet the A.S.M.E. Code for Unfired Pressure Vessels.

Need a new dryer end for your machine, or additional dryers? Let Downingtown engineer it for you.



DOWNINGTOWN MANUFACTURING COMPANY

DOWNINGTOWN, PA.

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY SINCE 188